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ABSTRACT

This document is the fourth of seven units developed by the Math Network Curriculum Project. Each unit, designed to be a 2-week module, is a teacher's guide which includes detailed directions along with the courseware and software needed. Teacher intervention in the non-computer activities that begin each unit is required, and the consistent use of small-group instruction makes the units usable in a standard classroom if two microcomputers are present. The Sampling Unit explores the use of sampling to make predictions about total populations. It begins with some concrete sampling activities and a computer sampling activity, the Guess My Bag program, designed to give the students some intuition about the relation of facts about a part of a population to facts about the whole. At the end of the unit, students set the evening schedule for a television network in a computer program called Prime Time. Their schedule will compete, via the phone network, with other classes' schedules. For this concluding activity, the Network Prime Time computer program and the telephone modem are used. The programs were developed for use on a Commodore PET Computer with at least 16K of RAM using 4.0 BASIC. Printed copies of the code for the three computer programs are included. (MNS)

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Sampling

Teacher's Guide

Math Network Curriculum Project

San Francisco State University

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O V E R V I E W

SAMPLES

We live in a world where every day we are bombarded by statistics. The Gallup Poll, Harris and other organizations keep us informed about what we think about a variety of issues. Advertisers try to convince us that their product is better than another because it is preferred "3 to 1" in Chicago.

Much of the information we receive daily is based on samples. Boswell quotes Samuel Johnson as saying "You don't have to eat the whole ox to know that the meat is tough". That is the essential idea of sampling—to gain information about the whole by looking at only a part of it.

There are several reasons why it makes sense to look at part of a population.

--It is often impossible to sample the entire population. For example, if I wanted to know what percent of seeds actually grow into plants, there is no way of finding this information for all seeds.

—It is often too expensive to sample an entire population.

--Frequently, samples give more accurate results than counting the whole population--for example, a careful sample of an inventory of spare parts will almost certainly give more accurate results than actually counting the 100,000 separate parts. Humans would surely make counting errors because the job is so tedious.

—It is faster to sample than to conduct a census.

In the unit, "Samples", students will be working with concepts of probability, equally likely, randomness, sample size, and objective/subjective data.

HOW TO USE THIS GUIDE

Once familiar with activities in this unit, you need only refer to the Summary of Activities. To review a particular activity, a more complete description, including teaching suggestions, follows the summary of activities. We hope teachers will feel free to modify our suggestions and to use their own ideas.

We intend that most teachers using this unit will have taken a course introducing them to the units. If you have not taken such a course, you will need to read through each activity, preferably with some friends. You will need to discuss the activity's purpose and possible pitfalls as you work.

The activities in the unit are of two kinds: Total Class and Independent Computer Work. During Total Class activities, the students will work on the unit either in groups, individually, or in a whole class format. Although some of these activities may require the whole class period (approximately 50 minutes), others will require less time.

During the Independent Computer Work, small groups of students will work at each computer while the other students will work on classroom assignments from outside this unit. These computer activities are starred (*) so you will know that during these days your regular program will be integrated along with the activity from this unit. Generally, groups of two or three students will be working together at a computer. These groups will rotate during a period of several days so that all students will have the opportunity to complete the activity. Using two computers, at least four groups per class period should be able to work at the computer.

In describing the time required for an activity, we will provide the approximate number of minutes required for Total Class activities and the approximate number of days required to rotate a class of 30 students through Independent Computer Work (assuming your classroom has 2 PET computers). In total, this unit requires about 385 minutes of Total Class Time and 8 days of Independent Computer time. The activities can be spread out over a period of time.

The activities in this unit are designed to be used in the sequence given.

SUMMARY OF ACTIVITIES

Total Time Required:
Total Whole Class Time: 150 minutes
***Independent Computer Time: 8 days**

1. VARIATIONS ON SIX

Students do six different experiments with dice, spinners, cards, etc., graph results to develop a feeling for when an event is equally likely.

Format - Whole class, Pairs
Time - 100 Minutes
Materials

6 SHEETS OF LARGE GRAPH PAPER
2 VARIATIONS ON SIX WORKSHEETS PER PAIR
1 VARIATIONS ON SIX DISCUSSION WORKSHEET PER PAIR
36 SMALL PAPER BAGS
1 LARGE PAPER BAG
3 DICE
3 DECKS OF CARDS
6 DIFFERENT COLORED WOODEN BLOCKS
3 SPINNERS
25 3x5 CARDS CUT IN HALF
6 BOXES OF CRAYONS

2. CUBES AND BEANS IN THE BAG

As a whole class, colored cubes are drawn from a bag and then replaced. Finally, on the basis of their sample, the class predicts about the composition of the bag. Then students repeat the sampling exercise working in pairs with beans.

Format - Whole class
Time - 50 minutes
Materials

20 SMALL PAPER BAGS
25 WOODEN CUBES
(14,8, and 3 of three different colors)
3 BAGS OF BEANS
(3 colors- all beans about same size or lima beans sprayed 3 colors
MASKING TAPE
1 BEANS IN THE BAG WORKSHEET PER PAIR
1 BEANS IN THE BAG DISCUSSION WORKSHEET PER 4

3. BEAN POPULATION

The class takes samples of beans to predict the contents of a bag of beans whose total number of beans is not known.

Format - Whole class
Time - 50 minutes
Materials
1 POUND OF WHITE BEANS
3 POUNDS OF BROWN BEANS THE SAME SIZE AS THE WHITE BEANS
1 LARGE PAPER BAG
1 LARGE SHEET OF GRAPH PAPER

*4. GUESS MY BAG

Students work in groups with a computer and use sampling to guess which bag the computer has chosen.

Format - Groups of two or three
Time - 2 days (15 minutes per group)
Materials
1 COMPUTER WITH GUESS MY BAG PROGRAM PER GROUP

5. CIRCLE A NUMBER

Students survey a number of people (as homework) to find out which of the numbers 1-4 are most frequently circled.

Format - Whole Class and Homework
Time - 25 minutes on first day and 25 minutes on second day
Materials
200 1-4 SLIPS OF PAPER
LARGE SHEET OF GRAPH PAPER

*6. PRIME TIME

Students use a computer program and schedule television programs for Tuesday night viewing. Surveys are taken prior to scheduling, and ratings tell how well they planned.

Format - Whole class and groups of 2-3 students
Time - 30 minutes and six days
Materials
1 COMPUTER WITH PRIME TIME PROGRAM PER GROUP
1 PRIME TIME PROGRAM SCHEDULE WORKSHEET PER GROUP
1 PRIME TIME NETWORK RATING REPORT PER GROUP
1 CURRENTLY WATCHING RESEARCH RECORDING SHEET PER GROUP
1 PEOPLE'S PREFERENCE RESEARCH RECORDING SHEET PER GROUP

7. NETWORK PRIME TIME

The class schedules a television network to compete with other classes' television networks using the phone network.

Format - Whole class
Time - 100 minutes
Materials
COMPUTER WITH NET PRIME PROGRAM AND TELEPHONE MODEM.

VARIATIONS ON SIX

Format
Whole Class
Pairs

Time
Two class periods
(about 150 minutes)

Materials Needed
6 sheets large graph paper
Worksheet for Variations on Six, two per pair
Worksheet for Variations on Six Discussion, 1 per pair
36 small paper bags
1 large paper bag or box with lid
3 dice
3 decks of cards
6 different colored wooden blocks (or crayons)
3 spinners (see end of activity)
25 3x5 cards, cut in half (or 20 cards and 18 tongue depressors)
6 boxes of crayons

Background

Students often believe that certain numbers or people are "lucky". They feel that wishing or wanting something to happen can help make it occur.

Frequently when probability is introduced in the schools, it is presented only in the abstract. For example, an introductory lesson might state, "A die has six sides. Since each side has an equally likely chance to come up when the die is rolled, we say that the probability of a particular number being rolled is one in six or 1/6."

This kind of presentation assumes that telling the students is enough to convince them that each number is equally likely. Not until students actually roll a die many, many times will they have a real understanding of what equally likely means.

With these experiences comes an understanding that actual outcomes seldom exactly match the predicted or expected outcomes--that a "1" will not be rolled exactly once every six times, or that out of 48 rolls, exactly eight of each of the six numbers will come up.

This activity assumes the students have had some experience making simple histograms. If not, make sure the students fully understand the directions to complete the graphs.

Purpose

- To have the students develop a "feeling" about equally likely and random selection.
- To have the students see the similarities underlying equally likely results in experiments with different physical materials.
- To have the students analyze and make predictions about the probability of an event.

Preparation

Run off "Variations on Six" worksheets so that each pair of students has at least two copies.

Run off one "Variations on Six" Discussion Worksheet for each pair.

Prepare three "Experiment Bags" for each of the experiments. Write the experiment number on the bag and tape a direction card on the bag. (See end of activity) The contents by experiment number are:

1. one die
2. one spinner divided into 6 equal parts labeled A, B, C, D, E, and F (See directions after this activity to make the spinners.)
3. all four Aces through 6's from a deck of cards
4. the two red 8's through Kings from a deck of cards
5. 6 different colored wooden blocks
6. (empty at this point. Random names will be drawn.)

Make the composite graphs (see end of activity for instructions). Post them in various locations on the walls or large tables around the room. Place a box of crayons by each graph.

Activity

Introduction

Ask the class if they think certain numbers or people are "lucky". For example, if they roll a die a lot of times, which numbers do they think will come up most often? (If they think certain numbers will come up more frequently than other numbers, find out which numbers and why they think this will happen.) Second example: If there were going to be a drawing for a free TV set and everyone's name was written on a paper, put in a box, mixed up, and then one drawn, would everyone have an equally likely chance to win, or are there certain people in the class who are more likely to win than others? Why?

Describe Experiments

Tell the class that each experiment is in a bag with a number on it. There are three identical bags for each experiment so that there will be enough to go around. Directions are written on a paper taped to the outside of the bag. They may not have time to do all experiments, and they do not have to be done in order. When finished with one experiment, they graph their results, bring the bag to the front of the room, and get another bag.

Explain that each experiment is different, but there are several things that are the same:

1. They are to do each experiment exactly 50 times. Each time anything removed or chosen must be returned to the original collection, which then must be thoroughly remixed by shaking or shuffling.

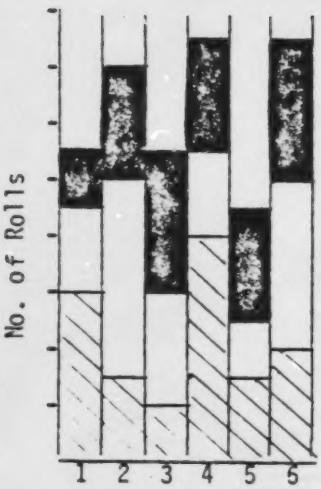
2. They will be working in pairs. One person is to do the experiment and the other person is to record the results on the worksheet. Record by using tally marks. Make a prediction first.

3. After completing each experiment, the group is to add their results to the cumulative graph.

Explain the directions for Experiments 1 through 5. (They are provided on the Direction Cards which should be taped to the bags.)

Prepare Bag No.6

Tell the class that in this activity, they will see who is the "luckiest" student. Distribute half a 3x5 card to each student. Have each student write her/his name on the card and put it in a box (with a lid) or large paper bag which is then thoroughly mixed. Then draw six cards and write those students' names on the composite graph. Put the six cards (with two other duplicate sets quickly made) into the No. 6 bags. (You might want to use tongue depressors instead of cards since they are easier to mix.)



Sample Graph for Experiment No. 1 After Three Groups Recorded Results

(first group results shown by ▨, second by □, and third by ■)

Explain the Graphs

Each experiment has a graph that is posted around the room. After completing each experiment, add your results to what is already there. Each square on the graph stands for two happenings. For example, if you rolled sixteen 1's, you would color in eight squares, starting above the last group's colored squares in the column marked "1". Use a different color crayon than the last group so we can keep track of each contribution.

Begin Experiments

Assign partners and have them sit together. Distribute the bags so at least two groups are working on each experiment. Remind them to go on to another experiment after they record their results. Walk around the room to see that the students understand what they are to do. Be sure they mix each collection carefully before each drawing.

After Experiments

As each pair finishes all the experiments, give the students a discussion worksheet. The pair should discuss the questions while waiting for others to finish.

Discussion

When everyone finishes, or when you fel they have spent enough time, collect the materials and pass out the rest of the discussion worksheets.

Go over the questions. Try to help students explain to other students that all the experiments were really the same. It might help some students if you cover up the labels on all six graphs. This will help them see that they can't tell the results of one experiment from the other.

Do not expect all students to understand the points of the lesson: All the experiments were the same except for the materials used. No number or person can be consistently lucky in a random experiment. The more times you do this kind of experiment, the more alike the columns will look.

Note: It will not help students for you to tell them these conclusions. They need to come to understand them for themselves by first doing many such experiments, then thinking about them, and finally discussing the experiments with other students.

You may want to do more experiments of this kind (perhaps the ones students invent in response to Question 8) during the Individual Computer Time later in the unit.

VARIATIONS ON SIX WORKSHEET

NAME _____ NAME _____

EXPERIMENT # _____

OUTCOME	TALLY

EXPERIMENT # _____

OUTCOME	TALLY

EXPERIMENT # _____

OUTCOME	TALLY

EXPERIMENT # _____

OUTCOME	TALLY

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VARIATIONS ON SIX

Student directions for six experiments

Teacher directions: Make three copies of this page, cut apart and tape to outside of appropriate bags.

EXPERIMENT #1 "DIE"

Shake die.
Roll die.
Record number that is rolled.
Do 25 times.

(contents: 1 die)

EXPERIMENT #2 "SPINNER"

Spin spinner.
Record letter the arrow points to.
Do 25 times.

(contents: Spinner divided into six equal parts and labeled "A,B,C,D,E,F")

EXPERIMENT #3 "Mini Deck"

Shuffle deck.
Choose one card without looking.
Record number on card.
Return card to deck.
Reshuffle.
Do 25 times.

(contents: Aces through 6's from a deck of cards)

EXPERIMENT #4 "Mini Red Deck"

Shuffle deck.
Choose one card without looking.
Record number on card.
Return card to deck.
Reshuffle.
Do 25 times.

(contents: red 8's through red Kings from a deck of cards)

EXPERIMENT #5 "BLOCKS"

Mix bag.
Draw out one block without looking.
Record color of block.
Return block to bag.
Re-mix bag.
Do 25 times.

(contents: six different colored blocks)

EXPERIMENT #6 "NAMES"

Mix bag.
Draw out card without looking.
Record name on card.
Return card to bag.
Re-mix.
Do 25 times.

(contents: 6 cards, each with a different student's name)

VARIATION ON SIX
DISCUSSION WORKSHEET

1. How are the six graphs the same? How are they different?

2. If the words and labels were removed, would it be very easy to tell which graph was which? Why or why not?

3. Are the heights of the columns about the same or do they vary? Why or why not?

4. Why was it important to shake the bag or shuffle the cards every time?

5. If we did each experiment 1000 times or a million times, could you predict what the results would be?

6. Were certain numbers or people "luckier" than others? Would you expect the same numbers or people to be "lucky" if we did the experiment again?

7. Would it be <u>possible</u> to be very "lucky" and roll
   10 1's in a row?

   100 1's in a row?

   1000 1's in a row?

   Would these happenings be likely?

8. Think of other experiments you could do besides these six that would give very similar results.

HOW TO MAKE A SPINNER THAT REALLY SPINS

1. Cut a circle from tag board. Poke a nice round hole exactly in the center.

2. Cut a square piece of tag board that's a little larger than the circle. Poke a hole through the center of this, too. Draw a line from the hole to one corner.

3. From the scraps left from cutting the circle, cut 3 little squares, about a cm. on a side each. They'll be used as washers. Poke a hole through each and crimp them a bit, too.

4. Take a paper clip and bend just the outside up.

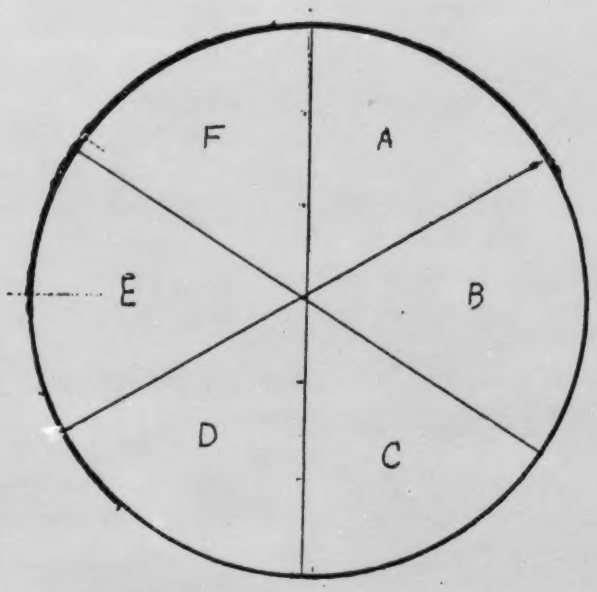
5. Cut a piece of masking tape that's about 4 cm or 5 cm long.

6. Assemble the spinner by first poking the paper clip through the square. Tape it on the bottom to hold it in place. Then put the three washers on.

7. Put the spinner face on next.

8. Add a piece of tape to cover the point of the paper clip.

9. Now it's ready to spin.



CUBES AND BEANS IN THE BAG

Format
Whole Class
Groups of Four

Time
1 class period
(about 50 minutes)

Materials Needed
20 small lunch sacks
25 wooden cubes
(14,8,3 of three different colors
3 bags of beans
(3 colors-all beans about same size) or lima beans sprayed 3 colors
1 Beans in the Bag Worksheet per pair
1 Beans in the Bag Discussion Worksheet per group of 4
Masking Tape

Background

In "Variations on Six", the students began to develop a feel for what it means to have an equally likely chance of being selected. In these activities, all of the possible outcomes were known in advance.

In "Cubes and Beans in the Bag", the students will do several activities where, after sampling, they will make inferences and predictions about the composition of a total population.

In these activities, the size of the sample size will vary. We want students to realize that generally, the larger the sample, the more accurate the prediction.

This activity also includes the possibility that some of the samples may be biased. Because of the variations in the objects being sampled (beans) and the sampling method used (selection by "hand" that involves touch), the results may be influenced so that our picture of the total population is not accurate.

Purpose

- To have the students begin to make inferences about a population based on random samples.
- To have students develop an awareness that in general, the larger the sample size, the more accurate the prediction.
- To give students the notion that some samples may be biased.

Teacher Preparation

Purchase lunch sacks and three different colors of dried beans. The beans should be as much the same size as possible. Each student will need a handful of each of the three colors of beans. (Or, spray lima beans with different colors of spray paint. Spread out on newspapers, spray, and let dry. Only one side needs to be sprayed.)

Before class, fill one sack with 25 wooden cubes: 14 blue, 8 red, and 3 green.

Run off Beans in a Bag Worksheets, at least one per pair of students. Run off Beans in a Bag Discussion Worksheet, at least one per group of four.

Students will need to tape the bottoms of the lunch sacks so beans won't fall out. Have a few students tape all the bags before class or have each pair of students tape their bag at the beginning of the activity.

Activity

Cubes in the Bag

Hold up the bag of cubes. Tell the students that there are 25 cubes in the bag and that the cubes are of three different colors. It is their task to figure out how many cubes there are of each color by looking at only one cube at a time.

Walk around the room and ask individual students to draw out a cube without looking inside the bag. Record what color it is on the chalkboard and then put the cube back into the bag. Shake the bag before every draw. Record with tally marks on the board.

After 25 draws, stop and ask the students if they're sure they've seen every cube. Why not? Ask if they can make a prediction about the number of cubes of each color in the bag. Record several predictions on the board. How sure are they of their predictions? How close did the sampling results as recorded on the blackboard match the actual contents of the bag? Would taking more samples help make them surer?

Take 25 more samples (drawing one cube out and returning it), recording after every draw.

Have each student write down a prediction on a piece of paper. Compare predictions and ask students to explain the strategy they used in making their predictions.

Vote on the several predictions. Ask the students if the vote makes the prediction true. Keep the voting results on the board.

Empty the bag, one block at a time, recording the color on the board.

Compare the actual results with the various predictions. How accurate were the predictions? How close did the sampling results (as recorded on the blackboard) match the actual contents of the bag? Would taking more samples have increased the accuracy? Did their predictions get more accurate as the sample grew?

With 25 blocks in the bag, how many samples do you think it is wise to take before you are pretty sure of your prediction?

Organizing Beans in the Bag

Assign the students to pairs, and have two sets of pairs work together.

Distribute a Beans in the Bag Worksheet, a paper lunch sack, and a handful of each of the three colors of beans to each student.

Instructions for Beans in the Bag

Each pair is to put 25 beans in a taped bag without the other pair seeing the color. They may use any combination of the three colors they want, any combination of two colors, or all one color. However, **there must be exactly 25 beans** in the bag. After the bag is filled, they are to exchange bags. Then both pairs are to draw out beans, one at a time, from the other pair's bag, recording the color in the "tally" section of the worksheet, and then return the bean to the bag. The bag should be reshaken before every draw. The students are to make a total of 40 draws from the bag. After every 10 draws, they should total the tally marks made so far, and they are to make a prediction on the worksheet about the color composition of the bag. When completed, they are to empty the bag, record the actual count, and see if their prediction got better with more samples.

Warn students not to tell the other pair how good their predictions are until they have completed all 40 draws.

Walk around the room while the students are working, clarifying instructions and seeing that students record their predictions on the worksheet after every 10 draws.

If some groups finish early, let them repeat the activity or have them discuss the Beans in the Bag Discussion Worksheet.

Large Group Discussion

Compare the results of the various groups.

-Did their predictions improve as their samples got larger?

-How frequently were predictions exactly right?

-Did all three kinds of beans feel the same? Were there any "biases" that caused them to choose one kind of bean more than another (size, shape, texture)? If so, did this bias influence the result so that all beans did not have an equally likely chance of being selected? Did it affect their predictions?

-Suppose we had 100 beans in the bags instead of 25; how many would we need to sample to have a fairly accurate prediction? Suppose we had 1000 beans in the bag?

-Suppose we had so many beans in the bag that we couldn't or didn't want to count them. Could we make predictions about the composition of the bag? Tell the class that this is the problem they are going to work on tomorrow.

Beans in the Bag Worksheet

Bag Predictors: _____ Bag Makers: _____

_____ _____

Draw Record

Color	Tally for 1st Ten Draws	Total No. Drawn after 10	Tally for 2nd Ten Draws	Total No. Drawn after 20	Tally for 3rd Ten Draws	Total No. Drawn after 30	Tally for 4th Ten Draws	Total No. Drawn after 40

Prediction

Color	After 10 Draws	After 20 Draws	After 30 Draws	After 40 Draws

Actual Count

Color	No. in Bag

Beans in the Bag
Discussion Worksheet

1. Was it easier to predict after 40 draws than after 10?
   Why or why not?

2. Did all three kinds of beans feel the same?
   Would a different feel affect results?

3. Suppose we had 100 beans in the bag instead of 25:
   How many would we need to sample to have a fairly accurate prediction?
   What if there were 1000 beans?

BEAN POPULATION

Format
Whole Class

Time
1 class period
(about 50 minutes)

Materials Needed
- 1 pound of white beans
- 3 pounds of brown beans
  (white and brown beans are same size)
- 1 large paper sack
- 1 large sheet graph paper

Background

In "Cubes and Beans in the Bag", the students made inferences about the color composition of a bag of cubes and a bag of beans when the total number of cubes or beans was known in advance. In the real world, we often do not know the total number in a population we want to sample. For example, we don't usually know the total number of people who will vote in the next election. But we are still interested in predicting what percentage of the unknown number of voters will vote for a certain candidate.

Thus, students need practice in predicting from a sample about a population whose actual size is unknown. "Bean Population" (adapted from Sampling Button Populations, 1972, National Wildlife Federation, 1412 16th Street, NW, Washington, D.C. 20036) provides this sort of practice.

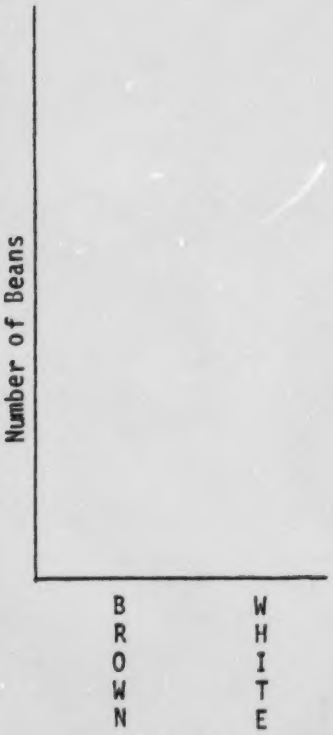
Purpose

- To have students make inferences based on random samples about a population whose size is unknown.
- To have students develop an awareness that in general, the larger the sample size, the more accurate the prediction.
- To give students the notion that some samples may be biased.

Preparation

Purchase one bag of white beans and three bags of brown beans (all bags and beans of the same respective size). Two of the colors used in "Beans in the Bag" may be used to make up part of the Bean Population. Mix the bags of beans together in another large bag. One quarter of the bag will be white beans, and three quarters will be brown beans.

Hang a large sheet of graph paper in front of the room with the long side vertical. Make a histogram titled "Bean Population" with long axis labeled "Number of Beans", and two spaces on the short axis labeled "White" and "Brown".



Activity

Introduction

Tell the class that today they will see if they can make predictions when they don't know how many are in the population. Yesterday they knew there were 25 cubes in each bag.

Show the bag of beans and tell them that the bag contains white beans and brown beans. After sampling, they are to see if they can predict the color composition (not the size) of the bean population.

Have one student take a handful of beans from the bag and record the number of white and brown beans in the handful.

Class Prediction

List the following on the chalkboard:
3 white and 1 brown,
2 white and 2 brown,
1 white and 3 brown,
4 white,
4 brown.

Ask the class to predict which of the board combinations would be most likely if they took only four beans from the bag with their eyes closed. Ask them why they made the predictions.

Individual Work

Mix the bag well. Have each child choose exactly four beans from the bag.

Have each child report individually on the color combination in their four beans. Tally results next to the color combination statements on the board and on the Bean Population histogram.

Discussion

Discuss results. Are they what was expected? Divide the total bag of beans up among the groups and have the students actually count the number of white and brown beans.

Have the students calculate exactly how many browns there are for each white bean by dividing the number of brown beans by the number of whites. Their result should be approximately three browns for each white.

Discuss this in terms of their findings when each student drew four beans at random.

Were there any biases when selecting beans so that one bean was chosen more than expected from the final count? How could we have controlled this? (Have beans exactly same size, not use hands that "feel" when choosing, etc.)

*GUESS MY BAG

Format
Groups of 2-3

Time
about 3 days of rotating groups (about 15 minutes per group)

Materials Needed
2 PET computers
"Guess My Bag" program

Background

Now students have had some concrete experience inferring from samples. They need more practice, but counting beans or cubes becomes tedious. Therefore, we will use the computer in this activity to provide practice at inferring from samples without the tedium. The computer will make up the bags and do the counting while the students will spend their time making inferences.

We also want students to become comfortable with histograms. In this activity the computer will show three possible bags by displaying three histograms. The students must guess which bag the computer has chosen by seeing which of the three histograms best matches the samples they have taken. A student can ask the computer to take as many and as large samples as they like, before they guess which histogram matches the computer's bag.

To encourage the students to make predictions on smaller samples, the computer gives them a score. The more objects they sample, the lower their score will be. There are three levels of difficulty students can choose from: 1, 2, 3. 1 is the easiest level, 2 is in the middle, and 3 is the hardest level. Students will have to take larger samples at higher levels of difficulty, and their score reflects this. The score is

difficulty * 50 - (number taken)

So if a student guesses the correct histogram at difficulty level 2 after sampling 75, their score is

2*50-75 or 25.

If their guess is wrong, their score is always zero.

Purpose

- To have students practice making inferences from samples.
- To have students become more comfortable with histograms representing populations.

Teacher Preparation

Preview and play "Guess My Bag" prior to introducing it in class. Play all three levels of difficulty.

Prior to or at the beginning of class, load "Guess My Bag" into the two PET computers.

Assign groups of 2-3 students to rotate through computers.

You need to plan other work for the students to do while the groups are rotating through the program.

Activity

Tell the students that they will be using the PET computers to play "Guess My Bag".

In this program, they have a bag with four different colors of beans in it. The computer will show them three different histograms, one of which matches the bag they have. The histograms show the percent of total beans of the four colors in the bag. They can take as large or as many samples as they wish. When they think they know which histogram matches their bag, they can guess. There are three levels of difficulty, with "1" being the easiest, and "3" being the hardest.

After guessing each bag, they will get a score that is based on the difficulty level and the number sampled.

Write "difficulty * 50 - (number taken)" on board. Go through a few examples to show them how their score is calculated. Point out that the larger their sample is, the lower the score, but if they guess wrong, their score is zero, and that the higher the difficulty level, the higher the possible score.

Rotate the groups through the program. There is no need to keep records of this activity. Each group should spend about 15 minutes using the program.

C I R C L E A N U M B E R

Format
Whole Class

Time
25 minutes, first day
25 minutes follow-up next day

Materials Needed
200 1-4 slips of paper (see end of activity)
large sheet of graph paper

Background

In this activity, the students see if any of the numbers from one to four are more frequently selected than the others. It is similar to "Variations on Six" in that all possible outcomes are known in advance. This is the first sampling activity where the students survey people. It is first done in class, and then a larger sample is taken. The difference between subjective and objective data is discussed.

Purpose

- To have the students do a survey of people's opinions.
- To have the students understand the difference between objective and subjective data.
- To have the students make inferences about a characteristic in a population based on a sample.

Preparation

Run off and cut apart 1-4 slips (see end of activity). Prepare a graph (with the long side vertical).

Activity

<u>In-Class Survey</u>

Pass out a 1-4 slip of paper to each student.

Ask the students to circle one of the numbers on the paper, without discussing it with anyone, and turn the paper face down.

Ask each student to write a prediction on the back of the slip:

1) Do you think any number will be circled lots more than any other number? If so, what number?

2) Why do you think that?

Small Group Discussion

In small groups of 4-5, have the students discuss their predictions and come up with a group prediction. Have them appoint a spokesperson for the group.

After approximately five minutes, have the spokesperson for each group present their predictions.

Discuss Group Work

How did the groups arrive at their prediction?

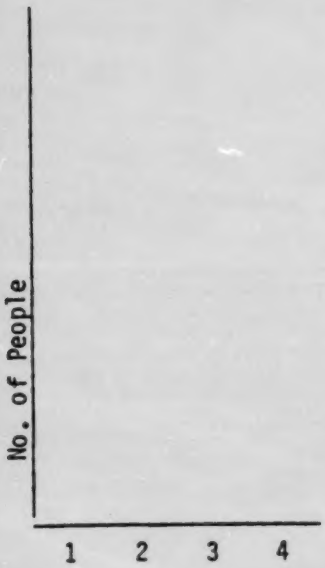
-Did all members agree?

-Did you go by majority rule?

-What other procedures did you use?

Graph Results

Graph the individuals' circled number on the graph (It will not be much data at this point, but more will be added to it tomorrow). Outline the top of the graph with black felt pen.



Ask the class:

-Did the results match the predictions?

-Tell the class that the idea for this activity came from the Sunday paper (San Francisco Chronicle, "The Grab Bag", by L.M. Boyd, November 30, 1980), and the article said that four out of five people would circle "3".

-Is that what happened in this class? Review the relation of "4 out of 5" to percents (80%). Have the students determine what percent of the class selected "3".

Homework

Give the homework assignment: Each student is to take five slips of paper and ask five people to circle the number.

Second Day Graphing

Tally the responses to the Homework Assignment.

Add the data to the large graph.

Discussion

-Did their results match the "Grab Bag" article's assertion? ("3" probably came up more often but not 80%. This discrepancy reflects the face that newspapers may exaggerate.)

-Why didn't the graph come out like the graphs in "Variations on Six"?

-Did all four numbers have an equally likely chance to come up? (No, because people chose numbers out of their minds rather than randomly.)

Objective and Subjective Data

Tell the class that there are many agencies that want to find out things about people, from how their height and weight compare (Have they seen such tables?) to what kind of cereals they like. There are generally two kinds of data we can collect about people- one kind of data, objective, like the height-weight, is a fact and doesn't change very frequently. The other kind, subjective, like the favorite cereals, is a person's opinion. Ask if this activity used objective or subjective data (subjective).

Have the students list several examples of subjective and objective information they may wish to know about people in general.

Ask the class which kind of information is more believable, objective or subjective? Can you find out everything you want to know by objective questions? (no)

1 2 3 4 1 2 3 4

1 2 3 4 1 2 3 4

1 2 3 4 1 2 3 4

1 2 3 4 1 2 3 4

1 2 3 4 1 2 3 4

1 2 3 4 1 2 3 4

*PRIME TIME

Format
Intro- Whole Class
Independent Computer Time-
Groups of 2-3

Time
Intro- 15 minutes
6 Days (enough for two 20-minute rotations through program for each group)
Discussion after computer session- 20 minutes

Materials Needed
PET computers
"Prime Time" program
1 Program Schedule Worksheet per group
1 Network Rating Report per group
1 Currently Watching Research Recording Sheet per group
1 People's Preference Research Recording Sheet per group

Background

"Prime Time" is designed to give the students a simulation in an area where sampling is used in the real world. Television networks are continuously using data gained from sampling to plan new schedules of programs and evaluate existing programs. In fact, the ratings, which are based on a small sample of about 1200 households, directly relate to the amount of advertising dollars a network can attract.

In this program, the user becomes the program director for a new television network (two other networks are already in existence). It is her job to plan a Tuesday night prime time (7-11 p.m.) schedule. The user will conduct research (that includes both objective and subjective data) prior to planning the schedule. After scheduling, ratings will be given for each week of the season. The user may change any program(s) in mid-season if ratings are low, but may not do any new research at that time.

The program schedules for the other two networks are determined by a 3-digit code number. The code number insures that the computer can generate the same schedule on the other two networks. This allows the user time to plan between phases of the program. The other networks programs are not determined completely randomly (it is assumed that they have used ratings in the past to plan a schedule that will do fairly well). Certain kinds of programs are more popular than others at a given hour. There are also optimal lengths for each kind of program.

The research department in the program provides three kinds of information. Objective data is presented by viewing the other networks' schedules, and relatively objective data is obtained by conducting a telephone survey to see what households are actually watching. Results are reported in number of households watching each program. (Some households are not watching TV, so the total watching will always be smaller than the sample size.) Subjective data can be obtained through supermarket surveys where people are asked what kind of shows are their favorite and what kind of programs they would like to see more of. Results of this survey will be somewhat biased since what people say and what people do don't always match. Generally, for both the objective and subjective surveys, the larger the sample size, the more sure the user can be that the results are similar to that of the entire population.

Ratings for the ten-week session are similar to the telephone survey in that information is presented on what people are actually watching. (It is assumed that the rating company has carefully designed their sampling method so the results tend to be fairly reliable.) Results for the ratings are given in percent of households watching. (Again, there will be households that are not watching television, so numbers will not add up to 100 percent.) You might want to use the Individual Computer Time to have students who are not using the computers conduct surveys around the school. They can graph their results. Possible survey subjects are eye color, kinds of shoes worn, favorite restaurant, kinds of school lunches, etc.

Purpose

- To have the students involved in a simulation of a "real life" activity in which sampling techniques are used.
- To have students make decisions based on information from a sample.
- To have students analyze how information from objective and subjective surveys contributed to their decisions.
- To have students realize that a sampling activity (ratings) will finally evaluate their decisions.

Preparation

Use the program "Prime Time" several times prior to introducing it in class. Vary how you conduct the surveys and schedule the programs so you can see some of the possibilities.

Prior to classroom use (or at the beginning of class) load the program into the two PET computers.

Activity

Whole Class Introduction

Explain the situation of the "Prime Time" program: They are the program planning director for a new TV network. They will conduct research prior to planning a schedule for Tuesday night's prime time (7-11 p.m.) programs, and then the programs will run for a ten-week season. Every week their programs and the programs from the other two competing networks will receive "ratings". These ratings tell what percentages of households are tuned in to each program.

After five weeks of the season, if their ratings are low, they may change any program.

Tell the class they will be using the program in two phases, (1) a research phase where they will gather information to help them plan their programs and (2) a scheduling phase where they will enter the programs they have planned and run them for the ten-week season.

Tell the students that in this first session with the program, they are to go only through the research section. They are to use the various worksheets to help them keep track of any information that they think will be helpful.

Tell the students that early in the program they are asked for a three-digit code number. It is important that they write this number down on the Program Schedule Worksheet so that they can get back the same schedule for the other two networks when they use the program later.

Students have a budget of $1000 for research. There is no point in saving this money. They can obtain

a) Other Network's Schedules for free;

b) Data on what people are watching at $2 per household;

c) Data of people's TV preferences at $3 per person interviewed.

Why would they want information from both b and c?

First Computer Session

Students, in groups, use Prime Time to do research. They will need the Program Schedule Worksheet and the two research recording sheets.

Schedule Planning Time

After a group has finished the first session, they will need 20-30 minutes off the computer to work as a small group and plan their program schedule. You may wamt to have the whole class do this at the same time (in the small groups), or you may have the small group plan their schedule immediately after their computer time.

Second Computer Session

Students use "Prime Time" to enter their schedules and receive their ratings. They will need all their old worksheets as well as the Network Rating Worksheet.

When using the program, where it asks whether they wish to (A) research or (B) schedule, they should type "B".

Discussion

When all groups are finished with the program, have them discuss and compare results--were there some kind of programs that seemed to do better in certain time slots?

Did the length of the programs matter?

How did the survey you did in the research department help you plan? Were some surveys more helpful than others? What sample sizes gave the needed information at the lowest cost?

What did the ratings show? (Explain that the ratings were done by a company. The rating company computes the ratings by taking samples. They carefully design their sampling method so they know results are fairly reliable.)

Optional Homework Activity

For homework, each student phones 7 households between 7 and 7:30 to survey which category of TV (if any) the household is watching. The results are graphed the next day.

Do their results match the Prime Time research results? (Note that the categories of shows will differ from those given by most seed numbers in Prime Time).

What are some problems they found in taking surveys? (What if no one is home? how can you get a "random sample"? Are friends "random"? Do some households watch more than one show at the same time?)

PRIME TIME
PROGRAM SCHEDULE WORKSHEET

Name_____ Seed No._____

Enter the program category number under ATC and ETS. Use arrows to show the length of each program. To plan program schedule for PTN, enter category number and program name. (names should be limited to 2 lines of 10 spaces.)

NET WORK

	ATC	ETS	PTN
7:00			
7:30			
8:00			
8:30			
9:00			
9:30			
10:00			
10:30			

CATEGORIES
1. Game Show
2. Situation Comedy
3. Action/Adventure/Western Series
4. Dramatic Series
5. Movie
6. News
7. Documentary
8. Sports Event

PRIME TIME
NETWORK RATING REPORT

NAME_____ SEED NO._____

Network:	SUMMARY: WEEKS 1-5			SUMMARY: WEEKS 6-10		
	Cat. Rating	Cat. Rating	Cat. Rating	Cat. Rating	Cat. Rating	Cat. Rating
7:00						
7:30						
8:00						
8:30						
9:00						
9:30						
10:00						
10:30						
AVERAGE RATING	____	____	____	____	____	____

OVERALL RATINGS

NETWORK	RATING
_____	_____
_____	_____
_____	_____

Currently Watching Research
Recording Sheet

Sample Size =

	ATC		ETS	
	Cat	#ON	Cat	#ON
7:00				
7:30				
8:00				
8:30				
9:00				
9:30				
10:00				
10:30				

Sample Size =

	ATC		ETS	
	Cat	#ON	Cat	#ON
7:00				
7:30				
8:00				
8:30				
9:00				
9:30				
10:00				
10:30				

Sample Size =

	ATC		ETS	
	Cat	#ON	Cat	#ON
7:00				
7:30				
8:00				
8:30				
9:00				
9:30				
10:00				
10:30				

People's Preferences Research
Recording Sheet

Sample Size =

Category	Favorite	Want More
1. Game		
2. Situation Comedy		
3. Action		
4. Drama		
5. Movie		
6. News		
7. Documentary		
8. Sports		

Sample Size =

Category	Favorite	Want More
1. Game		
2. Situation Comedy		
3. Action		
4. Drama		
5. Movie		
6. News		
7. Documentary		
8. Sports		

Sample Size =

Category	Favorite	Want More
1. Game		
2. Situation Comedy		
3. Action		
4. Drama		
5. Movie		
6. News		
7. Documentary		
8. Sports		

NETWORK PRIME TIME

Format
Whole Class and/or groups of 2-3

Time
2 Class Periods (about 100 minutes)

Materials Needed
"Network Prime Time" program
PET computer with telephone modem

Background

This activity is similar to "Prime Time" except that the class becomes the planning director, and the competition is one or two other classes on the telephone network. In this activity, the students won't know in advance what programs the other networks will be showing. Planning a schedule will be based on what they learned playing "Prime Time".

When the shows are run during the "season", ratings will be determined in the same way they were on "Prime Time".

Purpose

- To have students extend their experiences from "Prime Time" to the Network.
- To provide a large group decision-making experience.

Preparation

Contact other classes using the Network Bulletin Board to find one or two "competitors".

Activity

Introduction

Tell the class that now they have gained experience as program planning directors, they get to use their know-how in a slightly different experience.

Ask the class if in real life, a network knows in advance of the start of a season what programs the other networks will be showing (no).

In Network Prime Time, the whole class will work together to plan a schedule for a ten-week season. The competing networks will be actually other classes in the Math Network who have also done "Prime Time". No one will know in advance what programs the other

networks are scheduling. Ratings will be given each week during the season.

Decision Making

This is an excellent opportunity for the class to discuss how to decide on a fair and competitive schedule. They could work in small groups first, perhaps using current TV Guides and their Prime Time research, to get schedule ideas. These ideas could then be argued about or voted on.

They could work as a whole class to collect what they learned in "Prime Time" that would help them now. Elicit such things as what kinds of programs seem to do better at which time slots, and what are good lengths for each kind of program. Point out to the class that their competitors are also going to be planning, so they need to consider what they might do.

Finally, they can select a program schedule by voting, compromise (one program from one schedule, another program from another schedule, etc.), or consensus.

Entering Schedule

Once the class has decided on a schedule, they can enter it onto the Network using the Netprime Program. Refer to the Appendix, "Netprime User Manual", for detailed instructions.

APPENDIX

NETPRIME USER MANUAL

Math Network Curriculum Project

OVERVIEW

This manual assumes that you have familiarity with the Prime Time program!

NETPRIME runs on a 16K Pet with a D-Cat modem. Its purpose is to allow Prime Time schedules which have been stored on the MNCP network to compete against each other. The program allows you to load into its memory up to 7 different schedules and get their respective ratings.

USING THE PROGRAM

1. LOAD Netprime into the Pet in the normal way. Run the program. You will see the same T.V. screen come up that you saw in Prime Time. Press return to go on.

2. You now see the MAIN MENU on the screen. There are a lot of choices here and deciding what to do first can be confusing at first. Let us assume that you have in front of you a piece of paper which has on it a Tuesday night Prime Time schedule which you wish to enter into the machine, store on the network, and compare ratings with other such schedules.

The first thing to do is to choose 'C' which will allow you to transfer your schedule from the paper to the Pet using the keyboard.

3. Now you are asked for the name of your T.V. network. This will be the name that appears to other people when they decide which networks to compete against (so choose something clever). Hit <return> at the end of the the name. (Don't put extra spaces at the end of a network name since spaces can't be seen on the screen.)

4. Now you are asked for your group name. This name is just used to protect your schedule from being deleted by others. It will not be seen by others; but you need to remember it in case you ever want to change or delete your schedule. (Hit <return> as usual.)

5. You should see on the screen the same 'form' for entering a schedule that you saw in Prime Time except that there are no computer schedules. Enter your present schedule just as you are used to. Hold down the <shift> key and type & when you are done. (You can 'abort' this process at any time by holding down the <shift> key and typing @.)

6. You will get back to the MAIN MENU. Now is the time to STORE your schedule on the Network. This is choice 'D.' You will first be asked if you are connected to the network. Presumably, you haven't yet dialed up. So

answer 'N' (for No), followed by <return>, and then dial the number printed on the screen. (Directions for hooking up the modem are to be found in the 'Dandelion User Manual.')

7. Your Pet will then proceed to store your schedule on the network using the name and group that you typed in previously. The MAIN MENU will reappear when it is done.

8. Next, you would probably like to have your schedule compete against other schedules. But what are the names of other groups' schedules? Look on the MAIN MENU. Choice 'A' there allows you to see the names of the other schedules that are stored on the network. Choose it. You are again asked if you are connected to the network. If you haven't hung up, then you still are, so answer 'Y.' If you have hung up (to save your phone bill, for example) then answer 'N' and redial.

9. The statement 'beginning with:' appears on the screen. The idea is that there are lots of schedules out there and in some circumstances, you will not want to see all their names. Sometimes you will know that the name you want to see begins with a certain letter. In that case, just type in the letter or letters you know about. For example, if you know that the schedule you want to see begins with 'ABC,' but are not sure what comes next, just type in ABC (and hit <return>).

If you want to see ALL the names, don't type any letters. Just hit <return>.

The list of names will now appear on the screen. Write them down on paper so you won't have to list them again.

10. When you press return, you will end up back at the main menu again. You are ready to LOAD a schedule or schedules from the network to compete with yours. Choose 'B'. (As usual, you will be asked if you are connected to the network. Answer Y or N appropriately.) Then type in the name of the schedule you wish to have compete with yours and hit <return>. If it can't find that schedule, it will give you another chance. If it does find that schedule, you will see it come into your Pet, line by line, showing you the category and program name for each time slot.

11. Probably you will want to compete your schedule against more than one other schedule. So, when you get back to the MAIN MENU, choose 'B' again and load another schedule. Each time you return to the MAIN MENU, you will see the names of the networks you currently have loaded in your Pet.

12. Finally, you are ready to get ratings for your schedule! This is choice 'G' on the MAIN MENU. After choosing G, there will be a pause while the Pet computes the ratings. Eventually, the ratings for each network will appear on the screen, waiting for you to press <return> at the end of each.

13. Other things you can do from the MAIN MENU include 'E', deleting a schedule from your workspace. This essentially means to 'unload' a schedule. For example, if one of your competitors is too good, you might see how you do without competing against it.

14. You can also, using choice 'F', delete a schedule from the network. But, of course, you will have to know the name of the group that created that schedule. So, you can't get rid of your competition just by deleting them!

15. Lastly, you can QUIT, using choice 'H.' This is the right thing to do, especially if you want to SAVE the program to make a backup.

Note: When you get a particularly good schedule, you might want to 'publish' that fact by using the message system program, DANDELION, to send a message to

students, bulletins

so that others will know about good competition for their next schedules.

Appendix

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15. Lastly, you can QUIT, using choice 'H.' This is the right thing to do, especially if you want to SAVE the program to make a backup.

Note: When you get a particularly good schedule, you might want to 'publish' that fact by using the message system program, DANDELION, to send a message to

students↑, bulletins

so that others will know about good competition for their next schedules.

VARIATIONS ON SIX WORKSHEET

NAME_____ NAME_____

EXPERIMENT #_____

OUTCOME TALLY

_____

_____

_____

_____

_____

_____

EXPERIMENT #_____

OUTCOME TALLY

_____

_____

_____

_____

_____

_____

EXPERIMENT #_____

OUTCOME TALLY

_____

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EXPERIMENT #_____

OUTCOME TALLY

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_____

_____

VARIATIONS ON SIX

Student directions for six experiments

Teacher directions: Make three copies of this page, cut apart and tape to outside of appropriate bags.

EXPERIMENT #1 "DIE"

Shake die.
Roll die.
Record number that is rolled.
Do 25 times.

(contents: 1 die)

EXPERIMENT #2 "SPINNER"

Spin spinner.
Record letter the arrow points to.
Do 25 times.

(contents: Spinner divided into six equal parts and labeled "A,B,C,D,E,F")

EXPERIMENT #3 "Mini Deck"

Shuffle deck.
Choose one card without looking.
Record number on card.
Return card to deck.
Reshuffle.
Do 25 times.

(contents: Aces through 6's from a deck of cards)

EXPERIMENT #4 "Mini Red Deck"

Shuffle deck.
Choose one card without looking.
Record number on card.
Return card to deck.
Reshuffle.
Do 25 times.

(contents: red 8's through red Kings from a deck of cards)

EXPERIMENT #5 "BLOCKS"

Mix bag.
Draw out one block without looking.
Record color of block.
Return block to bag.
Re-mix bag.
Do 25 times.

(contents: six different colored blocks)

EXPERIMENT #6 "NAMES"

Mix bag.
Draw out card without looking.
Record name on card.
Return card to bag.
Re-mix.
Do 25 times.

(contents: 6 cards, each with a different student's name)

VARIATION ON SIX
DISCUSSION WORKSHEET

1. How are the six graphs the same? How are they different?

2. If the words and labels were removed, would it be very easy to tell which graph was which? Why or why not?

3. Are the heights of the columns about the same or do they vary? Why or why not?

4. Why was it important to shake the bag or shuffle the cards every time?

5. If we did each experiment 1000 times or a million times, could you predict what the results would be?

6. Were certain numbers or people "luckier" than others? Would you expect the same numbers or people to be "lucky" if we did the experiment again?

7. Would it be <u>possible</u> to be very "lucky" and roll
   10 1's in a row?

   100 1's in a row?

   1000 1's in a row?

   Would these happenings be likely?

8. Think of other experiments you could do besides these six that would give very similar results.

HOW TO MAKE A SPINNER THAT REALLY SPINS

1. Cut a circle from tag board. Poke a nice round hole exactly in the center.

2. Cut a square piece of tag board that's a little larger than the circle. Poke a hole through the center of this, too. Draw a line from the hole to one corner.

3. From the scraps left from cutting the circle, cut 3 little squares, about a cm. on a side each. They'll be used as washers. Poke a hole through each and crimp them a bit, too.

4. Take a paper clip and bend just the outside up.

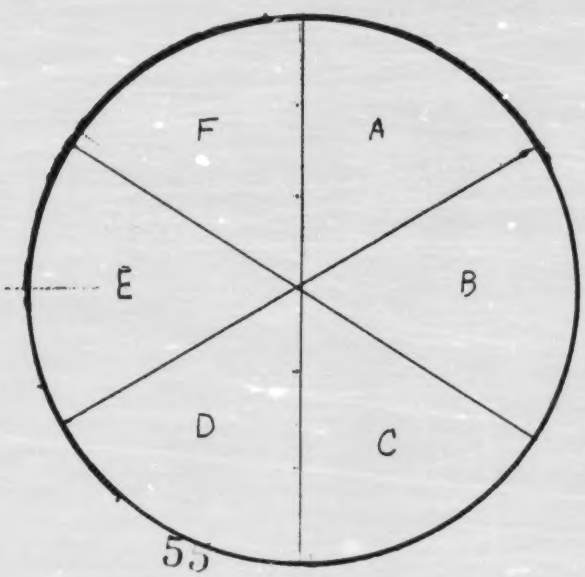
5. Cut a piece of masking tape that's about 4 cm or 5 cm long.

6. Assemble the spinner by first poking the paper clip through the square. Tape it on the bottom to hold it in place. Then put the three washers on.

7. Put the spinner face on next.

8. Add a piece of tape to cover the point of the paper clip.

9. Now it's ready to spin.



Beans in the Bag Worksheet

Bag Predictors: _____ Bag Makers: _____

_____ _____

Draw Record

Color	Tally for 1st Ten Draws	Total No. Drawn after 10	Tally for 2nd Ten Draws	Total No. Drawn after 20	Tally for 3rd Ten Draws	Total No. Drawn after 30	Tally for 4th Ten Draws	Total No. Drawn after 40

Prediction

Color	After 10 Draws	After 20 Draws	After 30 Draws	After 40 Draws

Actual Count

Color	No. in Bag

Beans in the Bag
Discussion Worksheet

1. Was it easier to predict after 40 draws than after 10?
   Why or why not?

2. Did all three kinds of beans feel the same?
   Would a different feel affect results?

3. Suppose we had 100 beans in the bag instead of 25:
   How many would we need to sample to have a fairly accurate prediction?
   What if there were 1000 beans?

1 2 3 4 1 2 3 4

1 2 3 4 1 2 3 4

1 2 3 4 1 2 3 4

1 2 3 4 1 2 3 4

1 2 3 4 1 2 3 4

1 2 3 4 1 2 3 4

PRIME TIME
PROGRAM SCHEDULE WORKSHEET

Name_____ Seed No._____

Enter the program category number under ATC and ETS. Use arrows to show the length of each program. To plan program schedule for PTN, enter category number and program name. (names should be limited to 2 lines of 10 spaces.)

NET WORK

	ATC	ETS	PTN
7:00			
7:30			
8:00			
8:30			
9:00			
9:30			
10:00			
10:30			

CATEGORIES
1. Game Show
2. Situation Comedy
3. Action/Adventure/Western Series
4. Dramatic Series
5. Movie
6. News
7. Documentary
8. Sports Event

Currently Watching Research
Recording Sheet

Sample Size =

	ATC		ETS	
	Cat	#ON	Cat	#ON
7:00				
7:30				
8:00				
8:30				
9:00				
9:30				
10:00				
10:30				

Sample Size =

	ATC		ETS	
	Cat	#ON	Cat	#ON
7:00				
7:30				
8:00				
8:30				
9:00				
9:30				
10:00				
10:30				

Sample Size =

	ATC		ETS	
	Cat	#ON	Cat	#ON
7:00				
7:30				
8:00				
8:30				
9:00				
9:30				
10:00				
10:30				

People's Preferences Research
Recording Sheet

Sample Size =

Category	Favorite	Want More
1. Game		
2. Situation Comedy		
3. Action		
4. Drama		
5. Movie		
6. News		
7. Documentary		
8. Sports		

Sample Size =

Category	Favorite	Want More
1. Game		
2. Situation Comedy		
3. Action		
4. Drama		
5. Movie		
6. News		
7. Documentary		
8. Sports		

Sample Size =

Category	Favorite	Want More
1. Game		
2. Situation Comedy		
3. Action		
4. Drama		
5. Movie		
6. News		
7. Documentary		
8. Sports		

PRIME TIME
NETWORK RATING REPORT

NAME_____ SEED NO._____

	SUMMARY: WEEKS 1-5			SUMMARY: WEEKS 6-10		
Network:						
	Cat. Rating	Cat. Rating	Cat. Rating	Cat. Rating	Cat. Rating	Cat. Rating
7:00						
7:30						
8:00						
8:30						
9:00						
9:30						
10:00						
10:30						
AVERAGE RATING	____	____	____	____	____	____

OVERALL RATINGS

NETWORK	RATING
_____	_____
_____	_____
_____	_____

GUESS MY BAG 1.2

```
READY.

 0 GOTO1000
 1 REM COPYRIGHT MATH NETWORK CURRICULUM PROJECT
 2 REM SAN FRANCISCO STATE UNIVERSITY, 1981
710 REM: 10 MAIN
712 REM: 12 RULES
714 REM: 14 SET UP BAG
716 REM: 16 DRAW SCREEN
718 REM: 18 DRAW HIST
720 REM: 20 NEW SAMPLE
722 REM: 22 TAKE SMPLE
724 REM: 24 DISPLAY SAMPLE
726 REM: 26 FIRST SAMPLE
730 REM: 30 GUESS
750 REM: 50 INIT
752 REM: 52 FILL BAG B
754 REM: 54 VAR OF B&B1
759 REM: -----------
809 REM: -----------
860 REM: 60 SET DIFF
880 REM: 80 GET CHAR
882 REM: 82 GET STRNG
884 REM: 84 NONEMPTY S
888 REM: 88 TO X
890 REM: 90 CLEAR LINE
899 REM: -----------
1000 REM-----MAIN ROUTINE OF WHAT'S MY BAG-----
1005 GOSUB 5000:REM INIT
1010 GOSUB 12000 TITLE PAGE
1015 GOSUB 1200:REM RULES
1020 GOSUB 6000 SET DIFFICULTY
1025 GOSUB 1600:REM DRAW SCREEN
1030 GOSUB 1400:REM SET UP BAGS
1032 GOSUB 2400 SHOW ZEROES
1033 GOSUB 2600:GOTO 1057  FIRST SAMPLE
1035 X=3:Y=21:GOSUB9000:REM CLEAR LINE
1040 PRINT"|YPE A ■NUMBER■ TO TAKE A SAMPLE,
1041 X=3:Y=22:GOSUB9000:REM CLEAR LINE
1042 PRINT"|YPE ■A■, ■B■, OR ■C■ TO GUESS THE BAG.
1045 X=3:Y=23:GOSUB9000:REM CLEAR LINE
1050 PRINT"■NUMBER■, OR ■A■, ■B■, OR ■C■: ";
1055 GOSUB 8400:IF(B$<"A"ORB$>"C") AND VAL(B$)<1 THEN 1045
1057 IF VAL(B$)>1000 THEN 1045
1060 IF VAL(B$)>0 THEN GOSUB 2000:GOTO 1035
1065 GOSUB3000:REM GUESS
1070 X=5:Y=23:GOSUB9000
1075 PRINT"ANOTHER BAG (Y OR N)? ";
1080 GOSUB8400:IFB$="Y"ORB$=" |"THEN1020
1085 IF B$<>"N" AND B$<>"/" THEN 1070
1090 PRINT"■■■ |OU WORKED ON"BN"BAGS
1095 PRINT"AND SCORED A TOTAL OF"TS"■■ POINTS.
1100 PRINT"■|HAT'S AN AVERAGE OF"FN ROUND(TS/BN)"POINTS PER BAG.
1105 PRINT"■       ■•O LONG NOW!
1110 END
1200 REM-----DISPLAY RULES-----
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1210 POKE 59468,14
1220 PRINT"❑       ▣UESS ↖Y |AG
1230 PRINT"↖ HAVE A BAG WITH 4 DIFFERENT COLORS OF
1240 PRINT"BEANS IN IT: ▒, +, π, AND *.
1250 PRINT"▣↖ WILL SHOW YOU THREE BAR GRAPHS.  ⌐NE
1260 PRINT"OF THESE BAR GRAPHS TRULY REPRESENTS
1270 PRINT"MY BAG.
1280 PRINT"▣ ⌐OUR TASK IS TO FIGURE OUT WHICH OF
1290 PRINT"THE THREE BAR GRAPHS IS CORRECT.
1300 PRINT"|HE WAY YOU DO THAT IS TO ▣SAMPLE■ BEANS
1310 PRINT"FROM THE BAG BY TYPING A NUMBER
1320 PRINT"(LIKE 10).
1322 PRINT"OHEN YOU THINK YOU KNOW THE CORRECT
1324 PRINT"GRAPH, TYPE ITS LETTER.
1330 PRINT"▣↖F YOU GUESS CORRECTLY, YOUR SCORE FOR
1340 PRINT"THE ROUND WILL BE:
1350 PRINT"    ▣↑↖──↖─人| ✱"MID$(STR$(FAC),2)"-(ノ人|¯_ |♠ノ¯ノ)
1360 PRINT"↖F YOU GUESS INCORRECTLY, YOUR SCORE
1370 PRINT"WILL BE ▣0■.
1380 RETURN
1400 REM-----SET UP BAG-------
1402 TTL=0:FOR I=0TO3:SMPL(I)=0:TTL(I)=0:NEXTI
1408 X=0:Y=23:GOSUB9000:PRINT"▣⅄UST A MOMENT WHILE ↖ GET READY: ";
1410 B=0:GOSUB5200:REM FILL BAG B
1420 FOR B=1TO2
1425 : C=0:REM COUNTER
1430 : GOSUB 5200:DNE$="T"
1440 : FOR B1=0 TO B-1
1450 :   GOSUB 5400:REM COMPUTE VARIANCE
1470 :   IF VAR<LV(DFF) OR VAR>HV(DFF) THEN DNE$="F"
1480 :   T=T+1:X=37:Y=23:GOSUB8800:PRINT"▣"CHR$(255+95*(T/2=INT(T/2)))
1490 : NEXT B1
1495 : C=C+1:IF C>5*B THEN B=2:NEXTB:GOTO1410
1500 : IF DNE$="F" THEN 1430
1510 NEXT B
1515 FOR B=0 TO 2:GOSUB1800:NEXT B
1520 BG=INT(RND(1)*3)
1530 Y=23:GOSUB9000  CLEAR CUE
1590 RETURN
1600 REM----DRAW SCREEN-----
1610 PRINT"❑       ▣|ERE ARE THE GRAPHS
1630 X=2:Y=15:GOSUB8800
1640 PRINT"|AG"BN;TAB(10)"⁻IFFICULTY="DFF;TAB(28)"♥CORE="TS
1650 PRINTTAB(13);
1660 FORI=0TO3:PRINTCOLR$(I);"    ";:NEXTI
1670 PRINT:PRINT"|HIS SAMPLE:
1680 PRINT"▣|OTAL EACH:
1690 X=29:Y=18:GOSUB8800:PRINT"|OTAL
1700 X=29:Y=19:GOSUB8800:PRINT"|AKEN:
1790 RETURN
1800 REM----DRAW A HISTOGRAM-----
1810 BX=B*13
1815 X=BX+1:Y=1:GOSUB8800:PRINT"%"
1820 FOR I=10TO1 STEP -1
1830 X=BX:Y=12-I:GOSUB8800
1835 IF I<10 THEN PRINT" ";
1840 PRINTMID$(STR$(I*10),2)"+"
1850 NEXT I
1860 X=BX+2:Y=12:GOSUB8800
1870 PRINT"0└──────
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1880 X=BX+5:Y=13:GOSUB8800
1890 FOR I=0TO3:PRINTCOLR$(I);" ";:NEXTI
1900 X=BX+5:Y=14:GOSUB8800
1910 PRINT"■GRAPH "CHR$(65+B)
1920 REM DRAW BARS
1930 FOR BAR=0TO3
1940 : X=BX+5+2*BAR:Y=12:GOSUB8800
1950 : IF BE%(B,BAR)=0THEN 1980
1955 :   PRINT"■▄▄▄▄";
1960 :   IF BE%(B,BAR)<8  THEN 1980
1965 :   FOR I = 1 TO FN ROUND((BE%(B,BAR)-5)/5)
1970 :     IF I/2 = INT (I/2) THEN PRINT"■ ■■";: GOTO 1977
1975 :     PRINT"▄▄";
1977 :   NEXT I
1980 NEXT BAR
1990 RETURN
2000 REM------NEW SAMPLE------
2010 X=5:Y=23:GOSUB9000
2030 TK=VAL(B$)
2050 GOSUB 2200:REM TAKE SAMPLE
2060 GOSUB 2400 DISPLAY SAMPLE
2140 RETURN
2200 REM----TAKE SAMPLE------
2205 X=0:Y=23:GOSUB9000:PRINT"■ICKING";
2207 C$=","
2210 FOR I=0 TO 3:SMPLE(I)=0:NEXTI
2220 FOR B=1 TO TK
2225 : GETA$:IFA$="-"THENFORI=0TO3:SM(I)=0:NEXTI:RETURN
2230 : C1=RND(1)*100
2240 : T=0
2250 : FOR C=0 TO 3
2260 :   T=T+BE%(BG,C)
2270 :   IF C1<T THEN CH=C:C=3
2280 : NEXT C
2290 : SMPLE(CH)=SMPLE(CH)+1
2315 : IFB/5=INT(B/5)THENPRINT"■"C$;
2317 : IF B/100=INT(B/100)THENC$=CHR$(ASC(C$)-1):X=7:GOSUB8800
2320 NEXT B
2330 FOR I=0 TO 3:TTL(I)=TTL(I)+SMPL(I):NEXTI
2340 TTL=TTL+TK
2390 RETURN
2400 REM-----DISPLAY SAMPLE---
2410 FOR C=0 TO 3
2420 : X=13+C*4:Y=17:GOSUB8800
2430 : PRINT"   ■■■"MID$(STR$(SMPL(C)),2)
2440 : Y=19:GOSUB8800
2450 : PRINTMID$(STR$(TTL(C)),2)
2460 NEXT C
2470 X=35:Y=19:GOSUB8800
2480 PRINTSTR$(TTL)
2590 RETURN
2600 REM----FIRST SAMPLE---
2610 X=3:Y=22:GOSUB 9000
2620 PRINT"HOW MANY BEANS TO SAMPLE? ";
2630 GOSUB8400:IF VAL(B$)<1 THEN 2610
2790 RETURN
3000 REM----THEY GUESS-----
3050 GUESS=ASC(B$)-65
3055 X=0:FORY=20 TO 21:GOSUB9000:NEXTY
3060 X=5:Y=22:GOSUB9000
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3065 T=DFF*FAC -TTL:IF T<0 THEN T=0
3070 IF GUESS=BG THEN GOSUB 3200
3080 IF GUESS <> BG THEN PRINT"■/OPE, IT WAS BAG "CHR$(65+BG)
3190 RETURN
3200 REM----CORRECT GUESS----
3210 PRINT"■I HAT'S RIGHT! ■-OR"T"POINTS!":TS=TS+T
3220 X=34:Y=15:GOSUB8800:PRINTTS
3230 RETURN
5000 REM-----INITIALIZE----
5010 T=RND(-TI)
5020 TS=0:REM TOTAL SCORE
5025 BN=0:REM BAG NUMBER
5030 D$="■■■
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 8250 IF B$="" AND A=13 THEN RETURN
 8260 IF A=13 THEN PRINTA$;:RETURN
 8270 IF A=20 AND LEN(B$)<2 THEN PRINTA$;:B$="":GOTO 8220
 8280 IF A=20 THEN PRINTA$;:B$=LEFT$(B$,LEN(B$)-1):GOTO 8220
 8290 IF A<32 OR (A>127 AND A<161) THEN 8220
 8315 IF LEN(B$)=38 THEN PRINT
 8320 PRINTA$;:B$=B$+A$
 8325 IFA$=CHR$(34)THENPRINTCHR$(34)"■";
 8340 GOTO 8220
 8400 REM---GET NON-EMPTY STRING---
 8410 B$="":POKE 158,0
 8420 GOSUB 8200
 8430 IF B$="" THEN 8420
 8440 RETURN
 8600 REM**WAIT FOR RETURN
 8630 PRINT"|O GO ON, PRESS ■┘¯| ╱_╱■ ";
 8640 POKE158,0:GOSUB8000:A=ASC(A$)
 8650 IFA=13THEN8680
 8670 GOTO8640
 8680 RETURN
 8800 REM-TO X,Y-
 8810 PRINT"□":PRINT"■";
 8820 IFX=0ANDY=0THEN RETURN
 8830 IFX=0THENPRINTLEFT$(D$,Y);:RETURN
 8840 IFY=0THENPRINTTAB(X);:RETURN
 8850 PRINTLEFT$(D$,Y)TAB(X);
 8860 RETURN
 9000 REM-----CLEAR LINE AT Y AND GET CHAR-----
 9020 X1=X:X=0:GOSUB8800:PRINTBL$;
 9030 X=X1:GOSUB8800
 9050 RETURN
 10000 REM---DIAGNOSTICS---
 10010 FOR B1=0 TO 2
 10020 : FOR C1=0 TO 3
 10030 :   PRINTBE%(B1,C1);
 10040 : NEXT C1:PRINT
 10050 NEXT B1
 10060 RETURN
 12000 REM**TITLE PAGE
 12005 POKE CR,14
 12010 PRINT"□"TAB(13)"■■■| ╱¯♥♥ ╲ | |♠|■■■"
 12015 PRINTTAB(6)"♠ PART OF THE ♥♠╲¯└╲╱|  ╱NIT■
 12020 PRINT" BY THE ╲ATH ╱ETWORK ¬URRICULUM ¯ROJECT■
 12030 PRINTTAB(16)"♥_♥ ╱■■■■■■■■4.0 |♠♥╲¬■
 12060 PRINTTAB(6);:GOSUB8600:PRINT"□"
 12070 RETURN
READY.
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PRIME TIME 1.2

```
READY.

 0 GOTO1010:REM COPYRIGHT MATH NETWORK CURRICULUM PROJECT,1982
 1 PRINT"■";:POKE59468,12:RETURN
 2 PRINT"■";:POKE59468,14:RETURN
 3 X=8:GOSUB8:PRINT"■'UST A MOMENT...■";:RETURN
 4 GOTO8000
 5 GOTO8200
 6 GOTO9400
 7 GOTO7800
 8 GOTO8800
 9 GOSUB8:IFPEEK(59468)=14THENPRINT" ÞU ONLY HAVE $"PB".";:RETURN
 10 PRINT"YOU ONLY HAVE $"PB:RETURN
 11 PRINT" 7:00":PRINT:PRINT" 7:30":PRINT:PRINT" 8:00":PRINT:PRINT" 8:30":PRINT
 12 PRINT" 9:00":PRINT:PRINT" 9:30":PRINT:PRINT"10:00":PRINT:PRINT"10:30"
 13 PRINT:PRINTL$:RETURN
 20 REM COPYRIGHT 1981, MNCP, SFSU
 25 REM AUTHORED BY DON MILTON, DESIGNED BY JOAN AKERS
 100 GOSUB2:PRINT:PRINT:PRINT"   ÞU ARE ABOUT TO DO A TELEPHONE
 101 PRINT"  SURVEY THAT ASKS PEOPLE TO KEEP A
 102 PRINT"  RECORD OF THE TELEVISION PROGRAMS
 103 PRINT"  THEY WATCH ON ÞUESDAY NIGHT, IF ANY.
 104 PRINT"  _ESULTS WILL VARY SOMEWHAT FROM
 105 PRINT"  WEEK TO WEEK.
 108 X=2:Y=20:GOSUB8:PRINT"ÞO RETURN TO _ESEARCH ¬EPARTMENT,";
 109 Y=21:GOSUB8:PRINT"       TYPE <■ ■ ■>";
 110 X=2:Y=13:GOSUB8:PRINT" ÞOW MANY HOUSEHOLDS?      ■■■■";:IL=4:B$=""
 111 GOSUB8200:Y=14:GOSUB8800:PRINTSP$;
 115 IFRE$=ES$THENRETURN
 120 SS=VAL(B$):IFSS<1 OR SS<>INT(SS)THEN110
 140 IFSS>PBTHENY=14:GOSUB8:PRINT" ÞU ONLY HAVE $";PB;".";:GOTO110
 150 PB=PB-2*SS:Y=18:GOSUB3:RETURN
 200 GOSUB2:PRINT:PRINT:PRINT"   ÞU HAVE NO MORE MONEY. ¬RESS
 210 PRINT"  ■ ■ ■ TO RETURN TO _ESEARCH
 220 PRINT"  ¬EPARMENT. ";
 230 GOSUB4:IFA$<>CHR$(13)THEN230
 240 RETURN
 300 GOSUB2:PRINT:PRINT" ¬N THIS SURVEY, PEOPLE THROUGHOUT THE
 310 PRINT" COUNTRY ARE QUESTIONED OUT SIDE OF":PRINT" SUPERMARKETS. ÞHEY ARE AS
KED:
 320 PRINT:PRINT"    1 ÞHAT IS YOUR FAVORITE KIND OF Þ.X.":PRINT"      PROGRAM?
 330 PRINT"    2 ÞHAT KIND OF Þ.X. PROGRAM WOULD YOU";:PRINT"      LIKE TO SEE MOR
E OF?
 341 X=1:Y=13:GOSUB8:PRINT" ÞOW MANY PEOPLE TO SURVEY?      ■■■■";:IL=4:B$=""
 343 GOSUB5:Y=14:GOSUB8:PRINTSP$;:IFRE$=ES$THENRETURN
 345 SS=VAL(B$):IFSS<1ORSS<>INT(SS)THEN341
 349 IF3*SS>PBTHENY=14:GOSUB9:GOTO341
 350 PB=PB-3*SS:RETURN
 600 GOSUB1:PRINTTAB(10)"■PROGRAM SCHEDULE
 610 PRINT"       ■ATC■          ■ETS■          ■PTN■
 620 CX=0:GOSUB11:PRINTTAB(12)"CATEGORY"
 623 PRINT" ■1■GAME   ■2■SIT COM ■3■ACTION ■4■DRAMA"
 625 PRINT" ■5■MOVIE ■6■NEWS     ■7■DOCUM   ■8■SPORTS
 626 PRINT" ■TIME■:        ■LENGTH■:";:PRINT" ■CATEGORY■:    ■NAME■:"
 630 LT$="":FORI=0TONT:Y=I*2+2:C0=SC%(0,I)+1:C1=SC%(1,I)+1
 640 IFLEFT$(PT$(0,I),1)<>" "THENX=5:GOSUB8:PRINT"■"C0;
 645 IFLEFT$(PT$(1,I),1)<>" "THENX=16:GOSUB8:PRINT"■"C1;
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 650 X=7:GOSUB8:PRINTLEFT$(PT$(0,I),9);:X=18:GOSUB8:PRINTLEFT$(PT$(1,I),9);
 660 Y=Y+1:X=7:GOSUB8:PRINTMID$(PT$(0,I),10);
 670 X=18:GOSUB8:PRINTMID$(PT$(1,I),10);:LT$=PT$(2,I):NEXT
 675 GOSUB900
 680 X=0:Y=24:GOSUB8:PRINT"ESCAPE=<▒SHIFT@■> : FINISHED=<▒SHIFT &■>";:UP=0
 700 X=7:Y=22:GOSUB8:PRINT"      ■■■■■";:B$="":IL=4:TF=1:GOSUB5
 702 IFRE$=ES$THENRETURN
 705 IFRE$=AC$THEN860
 710 T1=VAL(B$)/100:IFINT(T1)<7ORINT(T1)>10THEN700
 720 T2=INT((T1-INT(T1))*10/.6*100)/100:IFT2<>5ANDT2<>0THEN700
 730 T1=INT((T1+(T2*.1-7))*2):TF=0
 740 X=22:GOSUB8:PRINT"    ■■■";:IL=3:B$="":GOSUB5:L=VAL(B$)*2-1:IFRE$=ES$THEN700
 745 IFRE$=AC$THEN860
 750 IFL<0ORL>5ORT1+L>7ORL<>INT(L)THEN740
 760 X=11:Y=23:GOSUB8:PRINT" ■";:IL=1:B$="":GOSUB5:IFRE$=ES$THENY=22:GOTO740
 770 CA=VAL(B$)-1:IFCA<0ORCA>7THEN760
 780 X=18:GOSUB8:PRINT"                    ■■■■■■■■■■■■■■■■■■■■■■";:IL=20:B$="":GO
SUB5
 785 IFRE$=AC$THEN860
 790 N$=LEFT$(B$+SP$,IL):IFRE$=ES$THEN760
 795 IFRE$=AC$THEN860
 800 SC%(2,T1)=CA:PT$(2,T1)=N$
 820 IFL=0THEN850
 830 FORI=1TOL:SC%(2,T1+I)=CA:PT$(2,T1+I)=N$:NEXTI
 850 GOSUB900:GOTO700
 860 FORI=0TO7:IFSC%(2,I)>=0THENNEXTI:RETURN
 870 GOTO700
 900 LT$="":FORI=0TONT:Y=I*2+2:C2=SC%(2,I)+1
 910 IFC2<1THEN980
 920 IFLEFT$(PT$(2,I),1)<>" "ANDLT$<>PT$(2,I)THENX=27:GOSUB8:PRINT"▒"C2;
 930 X=29:GOSUB8:IFLT$=PT$(2,I)THENPRINT"■■  "LEFT$(FI$,10);:GOTO950
 940 PRINTLEFT$(PT$(2,I),10);
 950 Y=Y+1:X=29:GOSUB8:IFLT$=PT$(2,I)THENPRINTRIGHT$(FI$,9)" ";:GOTO980
 960 PRINTRIGHT$(PT$(2,I),10);
 980 LT$=PT$(2,I):NEXTI:RETURN
1010 GOSUB1200:GOSUB9200
1020 GOSUB2000:GOSUB2200
1040 GOSUB3000:UP=0:IFRE$=ES$THEN1020
1050 IFAN$="♠"THENGOSUB4000:IFRE$=ES$THEN1040
1060 GOSUB600:TF=0:IFRE$=ES$ANDWK=0THEN1040
1065 WK=WK+1:GOSUB7200
1070 GOSUB7000:IFAN$=" "ANDWK=1THEN1060
1080 IFWK=1THEN1065
1100 END
1200 D$="▒▒▒
```

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2060 Y=13:GOSUB8:PRINT"THE SAME SCHEDULE.
2070 Y=18:GOSUB8:PRINT"⌐NTER 3-DIGIT CODE:      ▮▮▮▮";:B$="":IL=3
2080 GOSUB5:IFLEN(B$)<>3THEN2070
2100 SN=VAL(B$):IFSN<10RSN<>INT(SN)THEN2070
2110 X=RND(-SN):SS$=B$:Y=21:GOSUB3:RETURN
2200 GOSUB2800:FORI=0TONN-1:FORJ=0TONT:IFSC%(I,J)<0THENGOSUB2400:GOSUB2600
2210 NEXTJ,I:RETURN
2400 CN=0:FORK=0TONC:IFDP%(K,J)>=MDTHENLS%(CN)=K:CN=CN+1
2420 NEXTK
2430 CH=LS%(INT(RND(1)*CN)):IFI<>1THEN2450
2440 IF CH=SC%(0,J)THEN2430
2450 SC%(I,J)=CH:RETURN
2600 CX=0:MA=NL:IFJ>3THENMA=NT+1-J
2610 L=INT(RND(1)*MAX):CH=SC%(I,J)
2620 IFDP%(CH,J)-LA%(CH,L)*DP%(CH,J)/100<MDTHEN2610
2621 LN%(I,J)=L
2622 XX=INT(RND(1)*4):IFN%(CH,XX)<0THEN2625
2623 CX=CX+1:IFCX=4THENGOSUB2400:GOTO2600
2624 GOTO2622
2625 PT$(I,J)=SN$(CH,XX):N%(CH,XX)=CH
2630 LN%(I,J)=L:IFL=0THEN2650
2640 FORLL=1TOL:SC%(I,J+LL)=CH:PT$(I,J+LL)=FI$:NEXTLL
2650 RETURN
2800 FORI=0TONC:FORJ=0TO4:N%(I,J)=-1:NEXTJ,I
2810 FORI=0TONN:FORJ=0TONT:SC%(I,J)=-1:LN%(I,J)=-1:NEXTJ,I:RETURN
3000 GOSUB2:X=7:Y=4:GOSUB8:PRINT" ⌋U MAY:";
3020 X=9:Y=7:GOSUB8:PRINT"▮▮ _ESEARCH |× VIEWING"SPC(21)"PRACTICES.";
3030 Y=11:GOSUB8:PRINT"▮|▮ ♥CHEDULE ⌐|/'S PRIME";
3040 X=11:Y=12:GOSUB8:PRINT"TIME |UESDAY PROGRAMS";
3050 X=7:Y=16:GOSUB8:PRINT" ⌋UR CHOICE (▮▮,▮|▮): ";:B$="":IL=1:UP=1
3060 GOSUB5:IFRE$=ES$THENRETURN
3070 IFB$<>"♠"ANDB$<>"|"THEN3050
3080 AN$=B$:RETURN
3200 SU=0:FORI=0TO7:F%(I)=FNM(B%(I)/100):SU=SU+F%(I):NEXT:FORI=0TO7
3203 IFSU<=0THEN3207
3205 FA%(I)=FNR(F%(I)/SU*SS)
3207 IFFA%(I)<0THENFA%(I)=0
3210 NEXT
3212 SU=SS:FORI=0TO7:SU=SU-FA%(I):NEXT
3213 D=INT(RND(1)*8):FA%(D)=FA%(D)+SU:IFFA%(D)<0THENFA%(D)=0:GOTO3212
3215 FORI=0TO7:P%(I)=0:NEXT:FORI=0TONU:FORJ=0TONT:XX=SC%(I,J):P%(XX)=P%(XX)+1
3220 NEXTJ,I:FORI=0TO7:P%(I)=P%(I)/16:NEXT:FORI=0TO7:F%(I)=B%(I)*(1-P%(I)):NEXT
3230 FORI=0TO7:M%(I)=FNM(F%(I)/100):NEXT:RETURN
4000 GOSUB4200:IFRE$=ES$ORAN$="⌐"THENRETURN
4020 ONASC(AN$)-192GOSUB4400,4600,4800
4090 GOTO4000
4200 GOSUB2:PRINTTAB(9)"_ESEARCH ⌐EPARTMENT"
4210 PRINT:PRINT"oE CAN PROVIDE YOU WITH INFORMATION TO"
4220 PRINT"HELP YOU PLAN THE PROGRAM SCHEDULE."
4230 PRINT" ⌋UR BUDGET FOR RESEARCH IS $"MID$(STR$(PB),2)".
4240 PRINT" ⌐⌐ | ♠×♣⌐L♠|L⌐ : $";
4250 PRINTRIGHT$(STR$(PB),LEN(STR$(PB))-1)
4260 PRINT"▮⌐NFORMATION AVAILABLE :
4270 PRINT"▮    ▮▮ ⌐THER NETWORKS CURRENT PROGRAM
4280 PRINTTAB(6)"SCHEDULES (⌐⌐♥| : FREE).
4290 PRINT"▮    ▮|▮ oHAT PEOPLE ARE CURRENTLY
4300 PRINTTAB(5)"WATCHING (⌐⌐♥| : $2 PER HOUSEHOLD).
4310 PRINT"▮    ▮⌐▮ oHAT PEOPLE SAY THEY LIKE TO
4320 PRINTTAB(6)"WATCH (⌐⌐♥| : $3 PER PERSON).
4325 PRINT"▮ ⌋U CAN ALSO:
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 4330 PRINT"■    ■■■ ♥CHEDULE ¬‖ ⁄'S PROGRAMS.
 4350 X=0:Y=22:GOSUB8:PRINT" ÐUR CHOICE:   ■■|";:B$="":IL=1:UP=1
 4360 GOSUB5:IFRE$=ES$ORRE$=AC$THENRETURN
 4370 IFB$>="♠"ANDB$<="−"THENAN$=B$:RETURN
 4380 GOTO4350
 4400 GOSUB1:PRINTTAB(8)"PROGRAM SCHEDULE    CODE:■";SS$
 4430 PRINT:PRINTTAB(9)"ATC              ETS
 4435 PRINT" ■TIME■ ■CAT■  ■SHOW■       ■CAT■  ■SHOW■"
 4460 GOSUB11:PRINTTAB(13)"CATEGORIES":PRINT"1 GAME     3 ACTION  5 MOVIE  7 DOC
 4480 PRINT"2 SIT COM  4 DRAMA   6 NEWS   8 SPORTS
 4490 FORI=0TONT:Y=I*2+4:X=6:GOSUB8:C0=SC%(0,I)+1:C1=SC%(1,I)+1
 4500 IFLEFT$(PT$(0,I),1)<>" "THENX=6:GOSUB8:PRINTC0;
 4505 IFLEFT$(PT$(1,I),1)<>" "THENX=21:GOSUB8:PRINTC1;
 4510 X=10:GOSUB8:PRINTLEFT$(PT$(0,I),9);:X=25:GOSUB8:PRINTLEFT$(PT$(1,I),9);
 4520 Y=Y+1:X=10:GOSUB8:PRINTMID$(PT$(0,I),10);:X=25:GOSUB8
 4530 PRINTMID$(PT$(1,I),10);:NEXTI
 4540 X=8:Y=24:GOSUB8:GOSUB7:RETURN
 4600 IFPB=0THEN200
 4605 GOSUB100:UP=0:NU=1
 4610 GOSUB5000:GOSUB1:PRINT"HOUSEHOLDS WATCHING TV  SAMPLE SIZE■";RIGHT$(STR$(S
S),4)
 4630 PRINTTAB(9)"ATC";SPC(14);"ETS
 4635 PRINT" ■TIME■ ■CAT■ ■SHOW■    ■# ON■ ■CAT■ ■SHOW■    ■# ON■"
 4660 GOSUB11:PRINT"CATEGORIES":PRINT"1 GAME     5 MOVIE":PRINT"2 SIT COM  6 NEW
 4680 PRINT"3 ACTION   7 DOCUM":PRINT"4 DRAMA    8 SPORTS";
 4700 FORTS=0TONT:Y=TS*2+3:X=6:GOSUB8:C0=SC%(0,TS)+1:C1=SC%(1,TS)+1
 4710 IFLEFT$(PT$(0,TS),1)<>" "THENX=6:GOSUB8:PRINTC0;:X=18:GOSUB8:PRINT"■"TL%(0
,TS);
 4715 IFLEFT$(PT$(1,TS),1)<>" "THENX=23:GOSUB8:PRINTC1;:X=35:GOSUB8:PRINT"■"TL%(
1,TS);
 4720 X=9:GOSUB8:PRINTLEFT$(PT$(0,TS),9);:X=26:GOSUB8:PRINTLEFT$(PT$(1,TS),9);
 4730 Y=Y+1:X=9:GOSUB8:PRINTMID$(PT$(0,TS),10);:X=26:GOSUB8
 4740 PRINTMID$(PT$(1,TS),10);:NEXTTS
 4750 X=16:Y=20:GOSUB8:PRINT"SURVEY ANOTHER WEEK? ";:IL=1:B$=""
 4760 GOSUB5:IFB$<>"Y"ANDB$<>"N"THEN4750
 4770 IFB$="N"THENRETURN
 4780 X=20:Y=21:GOSUB8:PRINT"SAMPLE SIZE=     ■■■■|";:IL=4:B$=""
 4785 GOSUB5:X=19:Y=22:GOSUB8:PRINTLEFT$(SP$,20);:IFRE$=ES$THENRETURN
 4786 SS=VAL(B$):IFSS<1 OR SS<>INT(SS)THEN4780
 4787 IFPB=0THEN200
 4788 IF2*SS>PBTHENX=19:Y=22:GOSUB9:GOTO4780
 4790 PB=PB-2*SS:GOTO4610
 4800 IFPB=0THEN200
 4803 GOSUB300
 4805 GOSUB2:PRINTTAB(7)"|.X. ¬ROGRAM ¬REFERENCES":PRINT:PRINT" ♥♠⁄¬└¯ ♥⁄♦¯=■"SS
 4810 PRINT"                  |■♠×┌_⁄|¯■|■O♠/|  ⁄┌_¯■|
 4820 PRINT"  ┌──────────────┬──────┬──────┐
 4825 FORI=1TO7:PRINT" |              |      |      |
 4830 PRINT"  ├──────────────┼──────┼──────┤":NEXTI
 4835 PRINT" |               |      |      |
 4840 X=0:Y=5:GOSUB8:PRINT"−| 1-|AME ♥HOW":Y=7:GOSUB8:PRINT"♠| 2 ♥IT / ¬OMEDY
 4860 Y=9:GOSUB8:PRINT"| | 3 ♠CTION/oESTERN":Y=11:GOSUB8:PRINT"¯| 4 ¬RAMA ♥ERIES
 4870 Y=13:GOSUB8:PRINT"| | 5 ⁄OVIE":Y=15:GOSUB8:PRINT"┌| 6 ⁄EWS
 4880 Y=17:GOSUB8:PRINT"_| 7 ¬OCUMENTARY":Y=19:GOSUB8:PRINT" || 8 ♥PORTS ¯⁄ENT
 4897 PRINT"  └──────────────┴──────┴──────┘":Y=22:GOSUB3
 4900 NU=1:GOSUB3200:FORI=0TO7:X=21:Y=I*2+5:GOSUB8:XX=FA%(I)
 4910 PRINT"■"XX;:X=31:GOSUB8:XX=FNR(M%(I)):IFXX<0THENXX=0
 4915 PRINT"■"XX;:NEXTI
 4920 X=1:Y=22:GOSUB8:PRINT"¬O YOU WANT ANOTHER SAMPLE? ";:IL=1:B$="":GOSUB5
 4930 IFRE$=ES$ORB$="⁄"THENRETURN
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 4940 IFB$<>" "THEN4920
 4950 Y=23:GOSUB8:PRINT"♠♠↖┐└¯ ♠↖◆¯=      ■■■■";:IL=4:B$="":GOSUB5:Y=24:GOSUB8
 4955 IFRE$=ES$THENRETURN
 4960 PRINTLEFT$(SP$,22);:SS=VAL(B$):IFSS<10RSS<>INT(SS)THEN4950
 4965 IFPB=0THEN200
 4970 IF3*SS>PBTHENY=24:GOSUB9:GOTO4950
 4980 PB=PB-3*SS:GOTO4805
 5000 FORI=0TONU:AV%(I)=0:NEXT:FORI=0TONT:GOSUB5200:GOSUB5400:GOSUB5800
 5010 GOSUB6000:NEXT:RETURN
 5200 AA=100:FORJ=0TONU:IFLN%(J,I)=-1THENAA=AA-PA%(J)
 5210 NEXTJ:RETURN
 5400 GOSUB5600:NW=AA:FORJ=0TONU:IFLN%(J,I)<>-1THENNW=NW*(1-D%(J)/100)
 5410 NEXTJ:WT=AA-NW:FORJ=0TONU:IFLN%(J,I)<>-1THENPA%(J)=D%(J)/SU*WT
 5420 NEXTJ:RETURN
 5600 SU=0:FORJ=0TONU:IFLN%(J,I)=-1THEN5660
 5620 D%(J)=DP%(SC%(J,I),I):RN=VA:IFSC%(J,I)=4ANDI>2ANDI<=4THENRN=SV
 5630 RN=INT(D%(J)*RN*RND(1)):IFRND(1)<.5THENRN=-RN
 5640 D%(J)=D%(J)+RN:D%(J)=D%(J)-D%(J)*LA%(SC%(J,I),LN%(J,I))/100
 5650 IFJ=NN-1THENGOSUB6200
 5660 SU=SU+D%(J):NEXTJ:RETURN
 5800 WT=0:FORJ=0TONU:IFLN%(J,I)=-1THENGOTO5810
 5810 TL%(J,I)=FNR(FNM(PA%(J)/100)):IFTL%(J,I)<0THENTL%(J,I)=0
 5820 WT=WT+PA%(J):NEXT:RETURN
 6000 FORJ=0TONU:AV%(J)=AV%(J)+PA%(J):NEXT:RETURN
 6200 FORK=0TONN:IFSC%(NN,I)=SC%(K,I)THEND%(NN)=D%(NN)*.75
 6210 NEXT:RETURN
 7000 NU=2:SS=1500:GOSUB2:PRINTTAB(9)"/ETWORK _ATING _EPORT":PRINT"o¯¯/: ■";
 7010 IFWK=1THENPRINT"1-5":GOTO7020
 7015 PRINT"6-10"
 7020 X=6:Y=3:GOSUB8:PRINT"  ♠|-  |  ¯|●  |  ¯||/  |"
 7030 Y=4:GOSUB8:PRINT"■┼AT■ ■%  ■|■┼AT■ ■%  ■|■┼AT■ ■%  ■|"
 7040 Y=5:GOSUB8:PRINT"■/0.■ ■¯N ■|■/0.■ ■¯N ■|■/0.■ ■¯N ■|"
 7050 PRINT" 7:00":PRINT" 7:30":PRINT" 8:00":PRINT" 8:30":PRINT" 9:00":PRINT" 9:
30":PRINT"10:00":PRINT"10:30"
 7060 FORY=6TO13:X=13:GOSUB8:PRINT"|        |        |":NEXTY
 7070 Y=18:GOSUB3:UP=1:SS=1500:NU=2:GOSUB5000
 7080 S0=0:S1=0:S2=0:FORI=0TO7:Y=I+6:X=6:GOSUB8
 7085 IFLN%(0,I)>=0THENPRINTSC%(0,I)+1;:X=9:GOSUB8:PRINTFNR(TL%(0,I)/SS*100)
 7086 IFLN%(0,I)>=0THENS0=S0+TL%(0,I)/SS*100*(LN%(0,I)+1)
 7090 X=14:GOSUB8:IFLN%(1,I)>=0THENPRINTSC%(1,I)+1;:X=17:GOSUB8:PRINTFNR(TL%(1,I
)/SS*100)
 7095 IFLN%(1,I)>=0THENS1=S1+TL%(1,I)/SS*100*(LN%(1,I)+1)
 7100 X=22:GOSUB8:IFLN%(2,I)>=0THENPRINTSC%(2,I)+1;:X=25:GOSUB8:PRINTFNR(TL%(2,I
)/SS*100)
 7105 IFLN%(2,I)>=0THENS2=S2+TL%(2,I)/SS*100*(LN%(2,I)+1)
 7110 NEXTI:PRINT:PRINT"♠VERAGE";TAB(9)FNR(S0/8)TAB(17)FNR(S1/8)TAB(25)FNR(S2/8)
 7120 X=2:Y=18:GOSUB8:IFWK<>1THEN7190
 7130 PRINT"¯O YOU WANT TO CHANGE A PROGRAM?  ■";:IL=I:B$="":GOSUB5
 7140 AN$=B$:IFB$<>" "ANDB$<>"/"THEN7120
 7190 RETURN
 7200 FORI=0TO7:LN%(2,I)=-1:NEXTI
 7205 XX=0:CX=0:FORI=0TO6:IFPT$(2,I)=PT$(2,I+1)THENCX=CX+1
 7210 IFPT$(2,I)<>PT$(2,I+1)THENLN%(2,XX)=CX:XX=I+1:CX=0
 7220 NEXTI:LN%(2,XX)=CX:RETURN
 7400 DATA "WIN SOME,LOSE SOME","GO FOR IT","ROAD TO  RICHES"
 7412 DATA "WIN THE  WORLD"
 7421 DATA "LUV IT UP","DAISIES  TELL","FRANTIC  FREDDY"
 7422 DATA "IT'S ALL RELATIVES"
 7431 DATA "STAMPEDE","SEATTLE  BEAT","HIGH SEAS"
 7432 DATA "MARTIAN  PROBE"
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 7441 DATA "REBECCA  BURK, DDS","HOMEWARD BOUND","547 HILL ROAD"
 7442 DATA "JUSTICE  FOR ALL"
 7451 DATA "MOVIE OF THE WEEK","TUESDAY'SMOVIE","MOVIE    SPECIAL"
 7452 DATA "FABULOUS FILMS"
 7461 DATA "NIGHTLY  NEWS","NEWSWATCH","NEWS     ROUNDUP"
 7462 DATA "UP TO THEMINUTE"
 7471 DATA "THIS WEEKIN TIME","THE WORLDAROUND US","ANIMAL   TALES"
 7472 DATA "UNIVERSE"
 7481 DATA "SPORT'S  ALL STARS","GAME OF  THE WEEK","BATTER   UP"
 7482 DATA "SPORTS   HIGHLIGHT"
 7630 DATA15,20,12,7,4,2,3,2,26,28,33,30,21,17,20,9,7,12,35,31,27,22,26,10
 7660 DATA2,4,15,22,28,25,28,23,4,10,20,23,27,7,3,1,25,11,5,2,1,1,1,15
 7690 DATA3,15,15,9,12,4,7,4,45,25,20,10,8,5,3,2,0,51,81,90,90,90,0,20,60,85,90
 7750 DATA90,10,0,65,70,80,90,30,0,40,60,90,90,90,80,60,0,40,40,0,25,60,70,90,90
,0,0
 7793 DATA25,50,90,90,70,30,20,0,45,45,16,25,35,30,29,25,18,45
 7800 IFPEEK(59468)=12THENPRINT"TO GO ON PRESS ▒RETURN▒ ";:GOTO7820
 7810 PRINT"|O GO ON PRESS ▒_¬| ,_/▒ ";
 7820 GOSUB4:IFRE$=ES$THENRETURN
 7830 IFA$<>CHR$(13)ANDRE$<>AC$THEN7820
 7840 RETURN
 8000 T=TI:RES$=RT$
 8020 IFTI<T+30THENPRINT"▒▒▒▒";:GOTO8050
 8025 IFLEN(B$)>9THENPRINT"▒";
 8030 IFTI<T+60THENPRINT" ▒▒";:GOTO8050
 8040 T=TI
 8050 GET A$:IFA$=""THEN 8020
 8055 IFA$=ACC$THENRES$=ACC$
 8057 IFA$=ESC$THENRES$=ESC$
 8060 PRINT" ▒▒";:RETURN
 8200 GOSUB4:A=ASC(A$)
 8240 IFB$=""ANDA=20THEN8200
 8250 IFB$=""ANDA=13THENRETURN
 8260 IFA=13THENPRINT:RETURN
 8262 IFRES$=ESC$THENPRINT:RETURN
 8264 IFRES$=ACC$THENPRINT:RETURN
 8270 IFA=20ANDLEN(B$)<2THENPRINT"▒ ▒▒▒";:B$="":GOTO8200
 8280 IFA=20ANDTF=1ANDLEN(B$)=2THENPRINT"▒▒▒  ▒▒▒";:B$=LEFT$(B$,LEN(B$)-1):GOTO820
0
 8285 IFA=20THENPRINT"▒ ▒▒▒";:B$=LEFT$(B$,LEN(B$)-1):GOTO8200
 8290 IFA<32OR(A>127ANDA<161)THEN8200
 8310 IFUP=1AND(A>64ANDA<90)THENA$=CHR$(A+128)
 8312 IFTF=1AND(A<48ORA>57)THEN8200
 8313 IFTF=1ANDA>49ANDB$=""THENB$="0":PRINTB$;
 8315 IFLEN(B$)>=ILTHEN8200
 8316 IFLEN(B$)>9THENPRINT"▒";
 8320 PRINTA$;:B$=B$+A$:IFTF=1ANDLEN(B$)=2THENPRINT":";
 8325 IFA$=CHR$(34)THENPRINTCHR$(34)"▒▒";
 8340 GOTO8200
 8800 PRINT"▒":PRINT"▒";:IFX=0ANDY=0THEN RETURN
 8830 IFX=0THENPRINTLEFT$(D$,Y);:RETURN
 8840 IFY=0THENPRINTTAB(X);:RETURN
 8850 PRINTLEFT$(D$,Y)TAB(X);:RETURN
 9200 GOSUB1:GOSUB6:X=9:Y=7:GOSUB8:PRINT"MATH  NETWORK
 9220 X=6:Y=10:GOSUB8:PRINT"CURRICULUM  PROJECT":REMFORI=1TO2000:NEXTI
 9240 X=12:Y=14:GOSUB8:PRINT"PRESENTS":REMFORI=1TO2000:NEXTI
 9260 X=4:Y=20:GOSUB8:GOSUB7:IFRE$=ES$THEN9260
 9280 GOSUB6:X=8:Y=6:GOSUB8:PRINT"▒▒▒▒
```

```
 9320 X=8:Y=9:GOSUB8:PRINT"▌ ▌▖ ▗▀▜ ▌ ▌▀▙ ";
 9330 X=10:Y=12:GOSUB8:PRINT"▙▗▟ ▝▗▟ ▀▜▗▟▗▟ ";
 9340 X=10:Y=13:GOSUB8:PRINT" ▌  ▌ ▌▌▌▀▙ ";
 9350 X=10:Y=14:GOSUB8:PRINT" ▌  ▌ ▌ ▌▌  ";
 9360 X=10:Y=15:GOSUB8:PRINT" ▌ ▗▀▜ ▌ ▌▀▙ ";:REMFORI=1TO1000:NEXTI
 9370 X=4:Y=20:GOSUB8:GOSUB7:IFRE$=ES$THEN9370
 9380 RETURN
 9400 LI$="▀▀▀
```

NETPRIME 2.0

```
READY.

 10 SYS1039:RUN
READY.


READY.

 5 REM COPYRIGHT 1981,MATH NETWORK CURRICULUM PROJECT
 6 REM SFSU, ALL RIGHTS RESERVED
 7 GOTO1000
 200 REM-NETIN-
 210 I$="":D1$="R"
 220 GOSUB400:IF(PEEK(S0)ANDRF)<>1THEN220
 230 SYSRX:A$=CHR$(PEEK(RB)):IFA$=RT$THENPRINT"■ ■";:SYSSD:RETURN
 240 I$=I$+A$:GOTO220
 400 REM-BLINK--
 410 IFDTHENPRINT"■"D1$"■";:D=FA:RETURN
 420 PRINT"■"D1$"■";:D=TR:RETURN
 500 REM-NET OUT-
 510 SYSBS:D1$="S":FORI=1TOLEN(O$):GOSUB400:POKEXB,ASC(MID$(O$,I)):SYSTX:NEXT
 520 POKEXB,13:SYSTX:PRINT"■ ■";:GOTO200
 600 POKE59468,12:PRINT"■";
 610 PRINTTAB(10)"PROGRAM SCHEDULE":PRINT TAB(7)"■"NN$(UN)
 620 CX=0:GOSUB2200:PRINTTAB(12)"CATEGORY
 623 PRINT" ■1■GAME  ■2■SIT COM ■3■ACTION ■4■DRAMA"
 625 PRINT" ■5■MOVIE ■6■NEWS    ■7■DOCUM  ■8■SPORTS
 626 PRINT" ■TIME■:        ■LENGTH■:":PRINT" ■CATEGORY■:    ■NAME■:"
 675 GOSUB900
 680 X=8:Y=24:GOSUB8800:PRINT"TO GO ON PRESS <■SHIFT■ ■%■>";:UP=0
 700 X=7:Y=22:GOSUB8800:PRINT"      ■■■■■";:B$="":IL=4:TF=1:GOSUB8200
 702 IFRE$=ES$THENNU=NU-1:RETURN
 705 IFRE$=AC$THEN860
 710 T1=VAL(B$)/100:IFINT(T1)<7ORINT(T1)>10THEN700
 720 T2=INT((T1-INT(T1))*10/.6*100)/100:IFT2<>5ANDT2<>0THEN700
 730 T1=INT((T1+(T2*.1-7))*2):TF=0
 740 X=22:GOSUB8800:PRINT"    ■■■";:IL=3:B$=""
 745 GOSUB8200:L=VAL(B$)*2-1:IFRE$=ES$THEN700
 750 IFL<00RL>50RT1+L>70RL<>INT(L)THEN740
 760 X=11:Y=23:GOSUB8800:PRINT" ■";:IL=1:B$="":GOSUB8200:IFRE$=ES$THENY=22:GOTO7
40
 770 CA=VAL(B$)-1:IFCA<0ORCA>7THEN760
 780 X=18:GOSUB8800:PRINT"                    ■■■■■■■■■■■■■■■■■■■■■■";:IL=20:B$=""
 782 GOSUB8200
 785 IFRE$=AC$THEN860
 790 N$=LEFT$(B$+SP$,IL):IFRE$=ES$THEN760
 795 IFRE$=AC$THEN860
 800 SC%(UN,T1)=CA:PT$(UN,T1)=N$
 820 IFL=0THEN850
 830 FORI=1TOL:SC%(UN,T1+I)=CA:PT$(UN,T1+I)=N$:NEXT
 850 GOSUB900:GOTO700
 860 FORI=0TO7:IFSC%(UN,I)>=0THENNEXT:RETURN
 870 GOTO700
 900 LT$="":FORI=0TONT:Y=I*2+2:C2=SC%(UN,I)+1
 910 IFC2<1THEN980
 920 IFLEFT$(PT$(UN,I),1)<>" "ANDLT$<>PT$(UN,I)THENX=7:GOSUB8800:PRINT"■"C2;
 930 X=9:GOSUB8800:IFLT$=PT$(UN,I)THENPRINT"■■  "LEFT$(FI$,9);:GOTO950
```

```
940 PRINTLEFT$(PT$(UN,I),10);
950 Y=Y+1:X=9:GOSUB8800:IFLT$=PT$(UN,I)THENPRINTRIGHT$(FI$,9);:GOTO980
960 PRINTRIGHT$(PT$(UN,I),10);
980 LT$=PT$(UN,I):NEXT:RETURN
1000 REM-MAIN--
1010 GOSUB1200
1020 PRINT"■":GOSUB9400
1025 GOSUB1400
1030 GOSUB9600
1050 GOSUB 2400
1060 ON CH GOSUB 12600,12000,3000,6000,4600,12200,4000,13000
1070 GOTO1050
1190 END
1200 D$="■■■
```

```
3402 IFNU<=MNTHEN3410
3404 PRINT"YOU MUST DELETE A SCHEDULE FIRST!
3406 GOSUB4800:RE$=ES$:RETURN
3410 PRINT"■■YOUR T.V. NETWORK WILL NEED A NAME!
3420 PRINT"■WHAT NAME DO YOU WANT TO USE?                    : ";
3430 B$="":TF=0:IL=16:UP=0:GOSUB 8200
3435 IFRE$=ES$THENRETURN
3437 UN=NU:NU=NU+1
3440 NN$(UN)=LEFT$(B$,16):B$=""
3450 PRINT:PRINT"■YOUR GROUP NEEDS A NAME, TOO.
3460 PRINT"■GROUP NAME: ";:GOSUB 8200
3470 GN$=B$:B$=""
3490 RETURN
3800 REM-RNING AVRGS-
3810 FORJ=0TONU-1:AV%(J)=AV%(J)+PA%(J):NEXT
3820 RETURN
4000 REM-FIND RSLTS-
4010 IFNU>0THEN4030
4020 PRINT"■SORRY YOU HAVE NO SCHEDULES LOADED
4022 PRINT"PRESS RETURN TO GO ON ";:GOSUB8000:RETURN
4030 PRINT"■FINDING RATINGS FOR
4040 FORI=0TO NU-1:PRINTTAB(5)"■"NN$(I):NEXTI
4050 PRINT"■PLEASE WAIT A MOMENT...
4055 GOSUB4400
4060 GOSUB5000
4070 GOSUB 4200
4080 RETURN
4200 REM-PRINT RSLTS-
4205 REM OPEN128,4:CMD128
4210 PRINT"■     ■NETWORK RATINGS
4220 FORTWK=0TONU-1
4230 : PRINT"■"NN$(TWK)
4232 : S%(TW)=0
4240 FORTS=0TONT
4250 PRINTSTR$(INT(7+TS/2))":";
4260 IF INT(TS/2)=TS/2THENPRINT"00";:GOTO4270
4265 PRINT"30";
4270 X=FNR(TL%(TWK,TS)/SS*100)
4280 IFLN%(TW,TS)=-1THENPRINTTAB(15)"V":GOTO4300
4290 PRINTTAB(7);CA$(SC%(TW,TS));TAB(15)PT$(TW,TS);TAB(31)X
4295 S%(TW)=S%(TW)+LN%(TW,TS)*X
4300 NEXT TS
4310 PRINT"-------------------------------------
4320 PRINT"AVERAGE = "INT(S%(TW)/(NT+1)*100)/100
4330 PRINT"■PRESS RETURN TO GO ON: ":GOSUB8000
4340 NEXT TW
4345 REM GETA$:CLOSE 128
4390 RETURN
4400 REM-SETUP LN%-
4410 FORTWK=0TONU-1
4420 P=0:C=1:LN%(TW,0)=-1
4430 FOR TS=1TO NT
4435 LN%(TW,TS)=-1
4440 IFPT$(TW,TS)=PT$(TW,TS-1)THENC=C+1:GOTO4500
4450 LN%(TW,P)=C:P=TS:C=1
4500 NEXT TS
4510 LN%(TW,P)=C
4520 NEXT TW
4590 RETURN
4600 REM-DLTE FRM WRKSPCE-
```

```
4605 IFNU=0THENPRINT"■NONE TO DELETE!":GOSUB4800:RETURN
4610 PRINT"■■CHOOSE ONE TO DELETE:■
4620 FORTW=0TONU-1
4630 PRINTTAB(5)"■"CHR$(65+TW)"■. "NN$(TW)
4640 NEXTTW
4650 PRINT"CHOICE: ";:B$="":IL=1:UP=0:TF=0:GOSUB8200
4660 IFRE$=ES$THENRETURN
4665 CH=ASC(B$)-65
4670 IFCH<0ORCH>NU-1THEN4650
4672 IFCH=UNTHEN UN=-1
4675 N$=NN$(CH)
4680 NU=NU-1:IFCH>NU-1THEN4780
4690 PRINT"JUST A MOMENT...
4700 FORTW=CHTONU-1
4710 NN$(TW)=NN$(TW+1)
4720 FORTS=0TONT
4730 PT$(TW,TS)=PT$(TW+1,TS)
4740 SC%(TW,TS)=SC%(TW+1,TS)
4750 NEXTTS,TW
4760 FORTS=0TONT:PT$(NU,TS)="":SC%(NU,TS)=-1:LN%(NU,TS)=-1:NEXTTS
4780 PRINT:PRINT"■"N$"■ IS DELETED FROM WORKSPACE.
4800 REM-RETURN TO GO ON-
4810 B$="":IL=1:TF=0:UP=0:PRINT"■PRESS RETURN TO GO ON: ";:GOSUB8000:PRINT
4820 RETURN
5000 REM-AUDIENCES FOR NUMNTWKS--
5010 FORI=0TONU-1:AV%(I)=0:NEXT
5020 FORTS=0TONT
5030 GOSUB 5200 FIND AA
5040 GOSUB 5400 FIND AUDIENCE
5050 GOSUB 5800 COMPUTE WATCHING
5060 : GOSUB 3800 COMPUTE RUNNING TOT
5070 NEXTTS
5200 REM-FIND AVLBL AUDIENCE--
5210 AA=100
5220 FORTW=0TONU-1
5230 IFLN%(TW,TS)=-1THENAA=AA-PA%(J)
5240 NEXTTW
5250 RETURN
5400 REM--FIND AUDIENCES AND STORE IN ARRAY PA-
5410 GOSUB5600
5420 NW=AA
5440 FORTW=0TONU-1
5450 IFLN%(TW,TS)<>-1THENNW=NW*(1-D%(TW)/100)
5460 NEXTTW
5470 WT=AA-NW
5480 FORTW=0TONU-1
5490 IFLN%(TW,TS)<>-1THENPA%(TW)=D%(TW)/SUM*WT
5500 NEXTTW
5590 RETURN
5600 REM CMPTE ACTL DRWNG PWR .
5610 SU=0
5620 FORTW=0TONU-1
5625 IFLN%(TW,TS)=-1THEN5670
5630 D%(TW)=DP%(SC%(TW,TS),TS)
5640 RN=VAR:IF(SC%(TW,TS)=4)AND(TS>=2)AND(TS<=4)THENRN=SVAR
5645 RN=INT(D%(TW)*RN*RND(1))
5647 IFRND(1)<.5THENRN=-RN
5650 D%(TW)=D%(TW)+RN
5660 D%(TW)=D%(TW)*(1-LA%(SC%(TW,TS),LN%(TW,TS))/100)
5670 SUM=SUM+D%(TW)
```

```
5680 NEXTTW
5800 REM-COMPUTE WTCHNG-
5810 WT=0:FORJ=0TONU-1
5820 IFLN%(J,TS)=-1THEN5840
5830 TL%(J,TS)=FNR(FNM(PA%(J)/100))
5835 IFTL%(J,TS)<0THENTL%(J,TS)=0
5840 WT=WT+PA%(J)
5850 NEXTJ
5860 RETURN
6000 REM-ACTLLY STRE SCHDLE
6005 IFUN=-1THENPRINT"YOU HAVEN'T YET CREATED A SCHEDULE!":GOSUB4800:RETURN
6007 GOSUB12800
6010 PRINT"■OK, I'M TRYING TO STORE
6020 PRINT"  YOUR SCHEDULE NOW: ";
6030 GOSUB 12400
6040 IFNOTRETHENGOSUB6200:GOTO6010
6050 PRINT:PRINT"■■SUCCESS!
6090 RETURN
6200 REM-NME IN USE-
6210 PRINT:PRINT"■■"TTL$" IS ALREADY BEING USED.
6220 PRINT"■DO YOU WISH TRY TO DELETE IT?
6225 PRINT"(■ ■ OR ■/■): ";
6230 B$="":IL=1:TF=0:GOSUB8200
6240 IF B$="Y" OR B$=" |" THEN B$="":GOSUB 6600:IF RE THEN RETURN
6245 IF B$>"N" AND B$>"/" THEN 6225
6250 GOSUB3400
6390 RETURN
6600 REM DLTE OLD SCHDLE
6605 RE=0
6610 O$=MID$(STR$(LEN(NM$)),2):IFLEN(O$)<2THENO$="0"+O$
6620 O$="DPD"+O$+NM$+TTL$:GOSUB500
6630 IF I$="DPDT"THEN RE=-1:PRINT"■"TTL$" DELETED!":RETURN
6640 PRINT"YOU MUST NOT BE THE GROUP THAT
6650 PRINT"ORIGINALLY SET UP SCHEDULE FOR
6660 PRINT"■"TTL$"■."
6670 PRINT"■PLEASE CHOOSE A NEW NAME.
6690 RETURN
7400 DATA GAME,SIT COM,ACTION,DRAMA,MOVIE,NEWS,DOC,SPORTS
7630 DATA15,20,12,7,4,2,3,2,26,28,33,30,21,17,20,9,7,12,35,31,27,22,26,10
7660 DATA2,4,15,22,28,25,28,23,4,10,20,23,27,7,3,1,25,11,5,2,1,1,1,15
7690 DATA3,15,15,9,12,4,7,4,45,25,20,10,8,5,3,2,0,51,81,90,90,90,0,20,30,85,90
7750 DATA90,10,0,65,70,80,90,30,0,40,60,90,90,90,80,60,0,40,40,0,25,60,70,90
7752 DATA90,0,0
7793 DATA25,50,90,90,70,30,20,0,45,45,16,25,35,30,29,25,18,45
8000 T=TI:RES$=RT$
8020 IFTI<T+30THENPRINT"■■■";:GOTO8050
8030 IFTI<T+60THENPRINT" ■";:GOTO8050
8040 T=TI
8050 GET A$:IFA$=""THEN 8020
8055 IFA$=ACC$THENRES$=ACC$
8057 IFA$=ESC$THENRES$=ESC$
8060 PRINT" ■";:RETURN
8200 GOSUB8000:A=ASC(A$)
8240 IFB$=""ANDA=20THEN8200
8250 IFB$=""ANDA=13THENRETURN
8260 IFA=13THENPRINT:RETURN
8262 IFRES$=ESC$THENPRINT:RETURN
8264 IFRES$=ACC$THENPRINT:RETURN
8270 IFA=20ANDLEN(B$)<2THENPRINT"■ ■■";:B$="":GOTO8200
8280 IFA+TF=21ANDLEN(B$)=2THENPRINT"■■  ■■";:B$=LEFT$(B$,LEN(B$)-1):GOTO8200
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```
8285 IFA=20THENPRINT"■ ■■";:B$=LEFT$(B$,LEN(B$)-1):GOTO8200
8290 IFA<32OR(A>127ANDA<161)THEN8200
8310 IFUP=1AND(A>64ANDA<90)THENA$=CHR$(A+128)
8312 IFTF=1AND(A<48ORA>57)THEN8200
8313 IFTF=1ANDA>49ANDB$=""THENB$="0":PRINTB$;
8315 IFLEN(B$)>=ILTHEN8200
8320 PRINTA$;:B$=B$+A$:IFTF=1ANDLEN(B$)=2THENPRINT":";
8325 IFA$=CHR$(34)THENPRINTCHR$(34)"■";
8340 GOTO8200
8800 PRINT"■":PRINT"■";:IFX=0ANDY=0THEN RETURN
8830 IFX=0THENPRINTLEFT$(D$,Y);:RETURN
8840 IFY=0THENPRINTTAB(X);:RETURN
8850 PRINTLEFT$(D$,Y)TAB(X);:RETURN
9400 LI$="■■■
```

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12200 REM-NET DLTE--
12205 GOSUB12800
12210 PRINT:PRINT"■NAME OF SCHEDULE
12220 PRINT"TO DELETE: ";
12230 B$="":IL=16:UP=0:TF=0:GOSUB8200:NM$=B$
12232 IFRE$=ES$THENRETURN
12234 PRINT:PRINT"GROUP NAME: ";:B$="":GOSUB8200:IFRE$=ES$THENRETURN
12240 O$=MID$(STR$(LEN(B$)),2):IFLEN(O$)<2THENO$="0"+O$
12250 O$="DPD"+O$+B$+NM$:GOSUB500
12260 A$=MID$(I$,4,1):IFA$="C"THENPRINT"WRONG CREATOR NAME"
12270 IFA$="F"THENPRINT"NO SCEHDULE BY THATNAME"
12280 IFA$="T"THENPRINT"SUCCESSFUL DELETE
12290 GOSUB4800
12390 RETURN
12400 REM-NETSAVE-
12410 RE=0:REM ASSUME UNSUCCESSFUL
12450 O$=MID$(STR$(LEN(GN$)),2):IFLEN(O$)<2THENO$="0"+O$
12460 O$="DPA"+O$+GN$+NN$(UN):GOSUB500
12470 IF LEFT$(I$,4)<>"DPAT"THEN RETURN:REM NAME IN USE
12475 B$=MID$(I$,5)
12480 FORN=0TONT
12490 O$="DPL"+B$+STR$(SC%(NN,N))+PT$(NN,N):GOSUB500
12500 IF LEFT$(I$,4)<>"DPLT"THEN RETURN
12530 NEXTN
12540 RE=-1
12550 RETURN
12600 REM-NETNAMES
12602 PRINT:PRINT"■LOOK AT NET NAMES
12605 GOSUB12800
12610 PRINT"■BEGINNING WITH: ";:B$="":IL=16:UP=0:TF=0:GOSUB8200:SK$=B$:PRINT
12620 O$="DPN000"+SK$
12630 GOSUB500:IFMID$(I$,4,1)<>"T"THEN12660
12640 PRINTMID$(I$,8):GETA$:IFA$="_"THENGOTO12660
12650 O$="DPN"+MID$(I$,5,3)+SK$:GOTO12630
12660 PRINT"PRESS RETURN TO GO ON ";:GOSUB8000
12790 RETURN
12800 REM----DO DIALING----
12810 PRINT"ARE YOU CONNECTED TO THE NETWORK? ";
12820 IL=1:B$="":TF=0:PF=0:GOSUB8200
12830 IFB$<>"Y"ANDB$<>"N"ANDB$<>"/"ANDB$<>" |"THEN12820
12840 IFB$="Y"ORB$=" |"THENRETURN
12845 PRINT"PLEASE DIAL
12850 PRINTTAB(15)"■469-2125    "
12860 O$="HELLO FROM NET PRIME"
12870 GOSUB 500
12880 PRINT:PRINTI$
12890 RETURN
13000 REMQUIT
13010 POKE40,1:POKE41,4:PRINT"■■GOOD BYE THEN!":END
14000 REM---TEST----
14010 GOSUB1200:GOSUB1400:NU=2
14015 NN$(0)="TEST1"
14020 SC%(0,0)=0:PT$(0,0)="GAME"
14022 SC%(0,1)=0:PT$(0,1)="GAME"
14024 SC%(0,2)=1:PT$(0,2)="SIT COM"
14026 SC%(0,3)=2:PT$(0,3)="ACTION"
14028 SC%(0,4)=2:PT$(0,4)="ACTION"
14030 SC%(0,5)=2:PT$(0,5)="ACTION"
14032 SC%(0,6)=3:PT$(0,6)="DRAMA"
14034 SC%(0,7)=5:PT$(0,7)="NEWS"
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```
 14036 NN$(1)="TEST2"
 14040 SC%(1,0)=7:PT$(1,0)="SPORTS"
 14042 SC%(1,1)=7:PT$(1,1)="SPORTS"
 14044 SC%(1,2)=1:PT$(1,2)="SIT COM"
 14046 SC%(1,3)=2:PT$(1,3)="ACTION"
 14048 SC%(1,4)=2:PT$(1,4)="ACTION"
 14050 SC%(1,5)=2:PT$(1,5)="ACTION"
 14052 SC%(1,6)=3:PT$(1,6)="DRAMA"
 14054 SC%(1,7)=5:PT$(1,7)="NEWS"
 14095 GOTO1050
 14100 GOSUB4400
 14105 GOSUB5000
 14110 GOSUB4200
READY.
```